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POPULAR Computing WEEKLY

40p

17-23 May 1984 Vol 3 No 20

BRITAIN'S BEST-SELLING MICRO WEEKLY

Customer's QL reviewed

Computer Swap 01-437 4343

Free readers entries to buy or sell a computer.
Ring 01-437 4343 and give us the details

VIC 20 16K switchable Ram Pack wanted if you have one to sell then tel Reigate 43279 (evenings)

VIC 20 cassette deck 3K Ram joystick, Intro to Basic and lots of software 4 month old cost £200 sell for £120 one or swap for 48K Spectrum Tel HGTE 0423 865266 after 6pm.

STAR GAME
Vic Connection on Vic 20
see page 10

News Desk

Palace raises the spirits

PALACE Software will release its first game—*The Evil Dead* for the Commodore 64—on June 15

The game is based on the plot of the low-budget horror film *The Evil Dead* which is distributed by Palace Software's sister company, Palace Video The film in which a group of teenagers become posessed by the spirits of the undead and finish each other off was the top—selling video of 1983

The computer game of the film will sell for around £7 50 and the Commodore 64 version will shortly be followed by versions for the Spectrum and BBC micros

Palace is the first film company to move into software It plans a range of games developed from successful feature films Palace has the video rights to David Bowie's *Merry Christmas Mr Lawrence* the thriller *Diva* and a number of other horror picutres, including *Basket Case, Halloween* and *Chainsaw Massacre*

The video of *The Evil Dead*

continued on page 5 ▸

A new Dragon for Boots?

BOOTS—the high street retail chain— may well pull out of selling the Dragon 32 computer at the end of the Summer

Boots and Dragon have been negotiating over the future of the machine and it seems likely that the Dragon 32 will be replaced by a new Dragon home computer before Christmas

Commented Dragon's chief executive Brian Moore, To make a stark statement that Boots will not stock the Dragon 32 is to present only one piece of the equation We are talking to them about replacing it with another machine which we have

Althouth Boots is to stock the new machines from Amstrad and a selection of Japanese MSX micros, it will deinitely continue to support the Dragon 32 with software and also sell the Dragon 64 Said Boot's Peter Frost "Dragon computers will continue to feature in our range—whether that is with the 32 or not I cannot say We are aware of new products from Dragon 32 "

Only a month ago British Home Stores decided to discontinue sales on the 32

This Week

● **Reviews** *Includes a detailed look at* Heathrow *by Hewson Consultants on page 13* ● **Exclusive Review** *Beyond preproduction Andrew Pennell with the first critical review of a Sinclair customers QL on page 16* ● **Networking** *David Lawrence introduces a new series on page 26* ● **Commodore 64** *Adrian Warman discusses registers inside the SID chip See page 34* ● **New Releases** *This week's software includes* Battle Planet *from ISP Marketing and* The Pink Pearl *from Astrosoft Page 56*

Sinclair ZX Microdrives and ZX Interface 1

The affordable alternative to floppy discs...

...in the shops, now!

The unique ZX Microdrive system sets the ZX Spectrum apart from all other computer systems.

At a fraction of the cost of floppy discs it gives fast access to 85K of program and data on Microdrive cartridges. And it opens up exciting possibilities through an RS232 interface and local area network.

ZX Microdrives – the fast way to save or load 85K of program and data. £49.95

ZX Microdrives are controlled by ZX Interface 1

For their compact size, they're massively powerful. Each interchangeable Microdrive cartridge stores at least 85K of program and data!

You can create up to 50 files on the cartridge – identified by titles of your own choice.

And when you want to display the data again, Microdrives give you lightning fast access.

- Just 3.5 seconds to access a typical file.
- Only 9 seconds to LOAD a typical 48K program.

ZX Microdrives use the Spectrum's own power supply

Your first Microdrive is connected to Interface 1 by a Microdrive lead. Then, up to 7 more Microdrives can be added using Microdrive connectors. That gives you a minimum of 680K bytes of on-line capacity

With memory like that, the possibilities are limitless – stock control, word-processing, even huge adventure games!

With each Microdrive, you'll receive a Microdrive connector and Microdrive demonstration cartridge. Blank Microdrive cartridges cost £4.95 each. They are available in packs of 4 (with a free cartridge wallet) or singly

ZX Interface 1 – the multi-purpose controller £49.95

ZX Interface 1 is a multi-purpose device. It controls up to 8 Microdrives. And it adds file handling and communication facilities to your Spectrum.

So in one low-priced unit, you also get these two built in features.

- **RS232 interface** This industry standard interface allows you to link your Spectrum with full-size printers, communicate with other computers employing RS232, and transmit data over telephone lines via modems.
- **The ZX Net** Now you and your friends can transfer programs and data on a local area network – or even play computer games together

The ZX Net makes it easy and fast!

It links between 2 and 64 Spectrums, transmitting at 10 000 characters per second. (So a full screen is transferred in around 3 seconds!) With the ZX Net, only one person need type in a program. And a Microdrive or printer can be shared by everyone on the network!

ZX Interface 1 offers you all these facilities, and retains the same peripheral port as the Spectrum itself

With each ZX Interface 1, you'll receive a connecting lead for the first Microdrive, a ZX Net lead with jack plugs, plus a comprehensive manual.

An RS232 lead is available as an optional extra at £14.95

Available from: larger branches of Boots • WH Smith Computer Stockists • Greens Computer Centres • Spectrum Computer Stores • and larger branches of John Menzies • Dixons • Laskys • Currys • John Lewis Partnership • Rumbelows • British Home Stores • House of Fraser and many other good computer stockists nationwide.

Find out more – in your local shop!

The best way to evaluate ZX Microdrives and Interface 1 is to see them for yourself.

There is a full range of ZX peripherals – including ZX Interface 2 for joystick and ROM Cartridge capability alongside the only computer that supports them – the ZX Spectrum!

For more information, telephone Sinclair Research Ltd, on 0276 685311

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sinclair



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How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long. The articles and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work.

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Editorial

What s so great about the Japanese MSX standard for home computers? It's got a Z80 chip and 64K of memory Rather like a Spectrum with a bit more Ram — and that is now two years old

Yet go to the bar at any micro show and you will find directors and programmers from software houses talking about it Why?

Because the world's largest electronics companies — Sony, Hitachi, Canon, Sanyo, Fujitsu and Yamaha — are all producing MSX machines and everyone is frightened Frightened to ignore it Frightened to be the one to say MSX isn't the best thing since sliced bread And frightened to be left out.

Yet MSX is disappointing imagine the Japanese car manufacturers getting together and all producing vehicles based on the Ford Prefect

The Japanese electronics companies are desperate to enter the home computer market and so between them they are attempting to artificially impose a standard Unfortunately it isn't one to set the world alight But they do have the marketing clout to make a big splash with MSX — just wait till the Sunday supplement ads and billboard posters go up

Standards bring their own problems, though What choice will there be but to establish yet another 'standard' in a few years time when MSX is technically even more old hat? By then though it will have served its purpose and sold a million

Next Thursday

Next week's star game is Fruity for Commodore 64 by Lee Turner — eat the fruit but avoid the mushrooms

Evil Dead

◀ continued from page 1

has had a controversial history. It was granted an '18' certificate by the British Board of Film Censors. Subsequently the film title has been among those branded a 'video nasty' by the press and police—a charge hotly denied by Palace founder Pete Stone.

He says, "The Evil Dead is a horror film—it is there to shock—but it is definitely an entertainment film and not a video nasty. It could not be put in the same category as real video nasties like *Driller Killer* and *I Spit on Your Grave*.

"While *The Evil Dead* computer game is a horror game, we have gone out of our way to make sure there is nothing nasty about it. And it certainly doesn't set out to deprave or corrupt—far less in fact than other forms of media—comics, for example. In the game you have to defend yourself against some rather friendly-looking ghouls.

"I don't think there will be any controversy about it when people see the game."

The release of *The Evil Dead* computer game comes at a time when parliament has broadened the scope of the Bright Bill—designed to curb video nasties—to include video games. Under the Bill, video games which contain 'acts of gross violence' may have to be submitted to a video game equivalent of the British Board of Film Censors.

"Under the Bill, X-rated films will be banned on video and for computer games the situation will be even crazier," says Pete Stone. "Where do you draw the line—is *Space Invaders* an act of gross violence? The problem is that the people pushing these laws through have no idea what the video and computer games industries are about."

Record sales for CBM

COMMODORE International has announced record sales for the third quarter and nine month period ending March 31, 1984. Net income and earnings per share are also at an all time high.

Irving Gould, Commodore's chairman, said that the record figures resulted from continuing strong sales of micros in the business, educational and home market. Sales gains of the Commodore 64 were a major factor.

●Commodore's founder Jack Tramiel, who resigned suddenly from the company in January, has bought a seven per cent stake in a California-based medical computer company, Adac Laboratories.

Jack Tramiel is now a director of Adac and is thought to be looking to play an executive role in the company.

New offer from CGL

NEW buyers of the CGL Sord M5 home computer will be able to take advantage of CGL's latest offer.

The Starter Pack now includes a data recorder—valued at £35.95, in addition to the machine itself, Basic 1 Rom Cartridge, Basic I manual users' guide, mains adaptor and tv connector cable. Yet the price stays the same £149.95.

Acorn lights up

ACORN is in the process of taking over Cambridge-based Torch computers.

Torch uses the BBC circuit board as the basis for its micro. It also makes the Torch Z80 disc pack CP/M compatible second processor unit for the BBC micro.

Last year a take-over of Torch by GEC collapsed at the last moment and Torch founder Martin Vheland-Boddy was forced to resign as chairman.

Acorn's plan for Torch to become a wholly-owned subsidiary of Acorn apparently has the full support of Torch shareholders.

●Only two weeks ago Martin Vheland-Boddy announced that his new company Data Technologies would launch an IBM-compatible 8088 second-processor unit for the BBC micro. Called The Graduate it offers the 8088, 128K Ram plus either one or two disc drives for £600 and £869, respectively.

Mobile phone

RACAL Vodafone—a division of the Racal communications company—this week announces a revolutionary new computerised telephone system.

The company will announce a hand-held push-button radio telephone designed to be used on the move anywhere in the country—on foot, in a car or train.

The telephones will communicate with a nation-wide network of new computerised receiving stations conected to the conventional telephone service.

The computer controlling the system monitors the signal strength from each portable telephone, if the strength falters the computer will automatically sample adjacent base receiving stations and switch the telephone to any station giving a stronger signal. In this way any moving telephone is kept in touch as it moves across the country.

Racal plans the system to be operational in early 1985.

Speak your command

JCB Microsystems is working on a sophisticated speech recognition system for the Commodore 64, Spectrum and BBC computers.

The system, which will cost around £50 including a built-in microphone, will be the first low-cost speech recognition unit for a home micro capable of responding to a vocabulary of more than a few words. It can be taught to recognise the voice of its user speaking over 100 words. These spoken commands can then be used to trigger responses from a computer program. Since the package also includes a programmable speech synthesiser, in theory at least, conversations will be possible. It should be in production by the end of the Summer.

JCB has also finished work on the Commodore 64 version of its Dragon speech synthesis unit. The 64 version will be on sale next month, priced at 34.95.

Flexing the Dragon

COMPUSENSE'S implementation of Flex on the Dragon is at last available.

The disc operating system will run either on the Dragon 64 or an expanded Dragon 32 and comes complete with an *Editor/Assembler* package at £86.25.

Under Flex 48K Ram remains free to the user (16K more than with Dragon Data's OS9) and a 51 × 24 screen is presented which the user can define independently. Flex can run on any 5¼ inch disc drive and can format single- or double-sided, single- or double-density discs.

Flex should be available through dealers within the next month.

Further details from Compusense, 286D, Green Lanes, London N13.

Letters

Loss of memory

Re Peek and Poke, May 3-9 1984, to the question headed 'Two Bytes Missing' Mr Rogers answer is incorrect

The ?FRE(0) statement does not take up any user memory as room is allocated for it (as with any other Basic statement) in non user memory — in fact, the Basic Input Buffer

The Vic counts free memory as that between the end of arrays (pointer locations 49-50) and the start of string shortage (pointer 51-52)

When the Vic is switched on, 51-52 point to 7680 while 49-50 points to the byte directly after the end of the Basic program. But this is actually at 4099 rather than 4097 on the unexpanded Vic. This is due to the Basic program containing two bytes which one might not expect. These are the end link addresses which are present in all Basic programs and signify the end of the program

The end link address is always two zero bytes (0,0). These are present in memory even when no program is present and this is where T Multon loses the two bytes.

I hope this brief explanation is useful

Mike Davies
The Waverley
79 Rhosmaen Street
Llandeilo
Dyfed SA19 6HD

Bleep booster

With reference to Philip Veanbles, program (Key Bleeper in issue 17 Vol 3), there are many disadvantages to using this. Firstly, and most importantly, is that all programs no longer work! This is because the routine disrupts the multiple VDU calls. Thus, the command *Mode 2* which should be sent as *VDU 22,2* by the Basic Rom, is sent as *VDU 7,22,7,2* causing a beep, a change to *Mode 7*, and will turn the printer on!

Many other examples can be found such as *Print Tab(x,y)* and all printer codes. Also, the routine beeps whenever any character is printed on the screen. So, if your program has a lot of *Print* statements in or even if you are just *Listing* a program, cover your ears! On top of this, the program is Disc incompatible

The accompanying program overcomes all these problems, and beeps only when a key is actually pressed

The routine can be switched off by **FX 13,2* and on again

```
10 REM Key Bleeper -
   The REAL version
20 REM By Piyush Patel
30 REM
40 P%=&A00
50 [ OPT 3
60 PHA
70 LDA#7
80 JSR &FFEE
90 PLA
100 RTS
110 ]
120 ?&220=&00
130 ?&221=P% DIV 256
140 *FX14,2
150 ?&801C
```

by *FX 14,2. The beep channel can be changed by *FX 211 (channel), the pitch can be changed by **FX 213,(pitch)* and the duration can be changed by **FX 214,(duration)*

It works by using the key-pressed event. When a key is pressed, the computer first indirects via *&220* and *&221*, which normally points to a *RTS* in Rom. However, if we change this to point to our new routine, the routine will be executed each time a key is pressed (regardless of what else is happening). *P%* in line 40 may be changed to relocate the code to another address

Piyush Patel
119 Abbs Cross Lane
Hornchurch
Essex RM12 4XR

Too expensive

Why is it that computer buffs who are selling their computers (presumably because they have acquired new ones) try to recoup the buying price? I was after a Vic 20 for my son and thought I would buy a second hand one. As we already had software, magazines etc, I hoped I would be able to pick up the computer and cassette for £70-£80. Boy was I wrong! The cheapest quote I could get from a private seller was £110 00 — without any guarantee. Needless to say, I bought a new one, and for just under £140 I got the Vic, cassette, four games, two cartridges and the Basic guide, part one

The huge second hand prices asked for seem a bit odd — after all, you wouldn't expect to recoup the buying price on your car or stereo etc. I also believe that those people who try to sell second hand cartridges at around £5-£6 should note that if you buy one for £9 99 in a certain High Street shop, you get three free

James Tosh
16 Glenlyon Road
Leven
Fife

Disgusted and appalled

After reading Mr Hickman's letter in *PCW* Vol 3 No 17 I found myself forced to wonder what kind of irresponsible person he is — firstly, his attitude to Mel Croucher in a previous letter (*PCW* Vol 2 No 51) was one which quite disgusted me. He seemed to be condemning Mr Croucher's noble course of producing non-violent and highly enjoyable games

Then he has the nerve to make an attack on the moral decency of the nation — is he so naive that he thinks that the move to censor computer software was the work of do-gooders alone? I am assured that the move to include software in the 'video nasties' bill was met with considerable approval from the popular press (well the *Sun* anyway)

I am both appalled and disgusted by the apparent lack of concern shown by Mr Hickman towards young children today, who need to be protected from violence in their early stages of development

In Mr Hickman's earlier letter he claimed that all aggression was related to frustration, which is a fact I do not contest. But, he further suggests that playing computer games relieves frustration — we all know that this is not the case. How many cups of coffee have hit the wall when the aliens finally destroy your last ship and how many times have nasty words to the innocent resulted from a failure to pass mutant telephones"?

Jamie Purser
27 Grass Walk
Welford Road
Northampton

"Christopher Robin went down with Alice"

Chemical balance

Firstly, thank you very much for printing my chemistry program in your magazine (No 17). I would, however, like to point out some small printing errors in the write up to the program. When it says 'As it is, the balanced equation is $2\,C_4H_{10} + 13\,O_2 = 8\,CO_2 + H_2O$

There should be a *10* in front of the *H20*, otherwise it is unbalanced

At the bottom of the page, when an example was given, CO2 was missed off the product inputs and instead two *H20s* were printed

At the top of the page, on the right, a line is printed as $H_2S + SO_2 = H_2O$
It should read $H_2S + SO_2 = H_2O + S$

Robert Crook
N Devon

Apologies to our readers for any problems caused by our printing errors. These corrections should solve them.



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THE NEW COMPUTER GAMES MAGAZINE THAT BREAKS ALL THE RULES

Attention all you pixel-packers, midnight hackers and binary-bustin' bozos! Gorf's gift to gamesville has just hit the streets. Big K's the name and Big K's the game – it's a new magazine that's going to be music to your micros. Whatever Big K gets in its sights – technical, tactical or just plain old topical, don't expect anything typical. Big K **plays** it different and **says** it different. We're not afraid to shoot from the hip – and we're always hip when we shoot! We've a no-holds-barred approach to arcade strategy and adventure that'll have your CRT's tingling. Key in to Big K now for a magazine that puts news, reviews, programs and hardware under your fingertips. **After your first byte of Big K... the game will never be the same.**

THIS ISSUE: Modem Living – access the world through your micro and telephone – Big K makes the right connections.
- Win a full-sized BATTLEZONE arcade game in Big K's extravagant competition.
- What's all the fuss about? Big K examines the 68000 wonderchip.
- Atari 800XL review.
- 7 games programs for Commodore 64, Vic 20, BBC, Spectrum, ZX81, Oric, Atari.
- Atari graphics – read Big K's special feature.

Plus – Arcade Alley, dozens of games reviews, expert technical features, lots of fun and lashings of colour.

Third amazing issue on sale 17th May

Ask your newsagent for a copy – 85p



Vic Connection

A new game for Vic20 by Ian Craighill

This game, for the unexpanded Vic 20, is a version of *Connect 4* for two to four players. The idea of the game is to place your beads (by pressing *Return*) to make either a vertical, horizontal or diagonal line of four. When this is accomplished the Vic will automatically play a fanfare.

To avoid arguments, caused by accidentally placing a bead in the wrong column, there's a "check" key (*Space*) which helps to determine the position of the marker in relation to the beads. A bouncing routine is also included in the program.

Notes

The most difficult part of the game to program was checking the number of beads (lines 700-750). If the computer wanted to find a horizontal line, it would use *Peek* to count left and right of the original bead. If the answer was three, then there was a line of four.

0–7	Rem statements
30–40	Data for National Anthem
310–317	Variables
320–340	Set screen
400–490	Movement options
500–520	Bead drop
700–750	Check lines
800–910	Fanfare
1010–1020	Players option
1100–1130	"Check" Bar
1500–1520	Bounce routine
2000–2094	Instructions
2095–2100	Tune

```
9 REM****************
1 REM*              *
2 REM*VIC CONNECTION*
3 REM*              *
4 REM*     BY(C)    *
5 REM*IAN CRAIGHILL *
6 REM*              *
7 REM****************
10 RESTORE
20 DATA1 22,21,23
30 DATA215,1,215,1,219,1,212,1,5,215,1,219,1,223,1,223,1,220,1,223,1,5,219,1,21
5 1
40 DATA219,1,215,1 212,1,215,1,-1,0
300 POKE36879,25 POKE36878,15 PRINTCHR$(8)CHR$(142)"J"
305 GOSUB2000
310 BA(1)=81 BA(2)=87 BA(3)=42 BA(4)=43 C(1)=5 C(2)=3 C(3)=0 C(4)=8 A#=7703 CO=
30720
315 Y=7703 NM$(1)="■GREEN CIRCLE" NM$(2)="■ CYAN CIRCLE " NM$(3)="■ BLACK STAR
"
317 NM$(4)="■ GREEN CROSS"
320 FORP=7746TO8053 POKEP 91 POKEP+CO,2 NEXT
330 FORP=7680TO7701 POKEP,160 POKEP+CO,6 POKEP+374,160 POKEP+374+CO,6 NEXT
340 FORP=7680TO8054STEP22 POKEP,160 POKEP+CO,6 POKEP+21,160 POKEP+21+CO,6 NEXT
350 REM *************
360 REM * MAIN LOOP *
370 REM *************
380 GOSUB1000
400 FORT=1TOW
410 POKEY BA(T) POKEY+CO,C(T)
420 GETA$ IFA$=""THEN420
430 POKEY 32
440 IFA$="■"THENY=Y-1
450 IFA$="■"THENY=Y+1
460 IFA$=CHR$(13)THEN500
465 IFA$="C"THENPOKE36878,27 PRINT"J" END
467 IFA$=" "THEN1100
470 IFY=7703THENY=7722
480 IFY=7723THENY=7703
490 GOTO410
500 E=Y+44 IFPEEK(E)<>91THENPOKE36876,220 POKE36876,0 GOTO410
510 POKEE,91 POKEE+CO,2 E=E+22 IFPEEK(E)<>91THENE=E-22 GOTO530
520 POKEE BA(T) POKEE+CO,C(T) FORP=1TO50 NEXT GOTO510
530 Q=1 GOSUB1500 E=E-22 Q=0 GOSUB1500 E=E-22 Q=0 GOSUB1500 E=E+22 Q=0 GOSUB150
0 E=E+22
532 Q=1 GOSUB1500 E=E-22 Q=0 GOSUB1500 E=E+22
535 POKE36876,220 POKE36876,0 POKEE BA(T) POKEE+CO,C(T)
540 FORP=1TO4 GOSUB700 NEXTP RESTORE
550 NEXT GOTO400
700 READA D=E
710 D=D+A IFPEEK(D)=BA(T)THENSC=SC+1 GOTO710
720 A=A*(-1) D=E
730 D=D+A IFPEEK(D)=BA(T)THENSC=SC+1 GOTO730
740 IFSC=3THEN800
750 SC=0 RETURN
800 POKE36879 24+C(T)
805 FORP=8164TO8185 POKEP,99 POKEP+CO,C(T) NEXT
807 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■"LEFT$(NM$(T),1)"■■■■■"NM$(T),
810 Z=135 FORP=1TO40 R=INT(RND(1)*8) Z=Z+2.5
820 POKEE+CO,R POKE36876,Z
845 D=E
850 D=D+A IFPEEK(D)<>BA(T)THENPOKE36876,0 GOTO870
860 POKED+CO,R POKE36876,0 GOTO850
870 D=E A=A*(-1)
880 D=D+A IFPEEK(D)<>BA(T)THEN900
890 POKED+CO,R GOTO880
900 A=A*(-1) NEXT
910 FORP=1TO300 NEXT RUN
1000 PRINT"■■HOW MANY PLAYERS (2-4)"
1010 GETA$ IFA$<>"2"ANDA$<>"3"ANDA$<>"4"THEN1010
1020 W=VAL(A$) PRINT"■■                         " RETURN
1100 E=Y+44 Z=241 IFPEEK(E)<>91THEN410
1110 POKEE+CO,1 E=E+22 Z=Z-5 POKE36876,Z IFPEEK(E)=91THEN1110
1115 E=E-22
1120 POKEE+CO,2 E=E-22 Z=Z+5 POKE36876,Z IFE=Y+22THENPOKE36876,0 GOTO410
1130 GOTO1120
1500 Z=PEEK(E) POKEE BA(T) POKEE+CO,C(T) FORP=1TO50 NEXT POKEE,Z POKEE+CO,2
1510 IFQ=1THEN POKE36876,220 POKE36876,0 RETURN
1520 FORP=1TO25 NEXT RETURN
2000 PRINT"■  INSTRUCTIONS-(Y/N)" PRINT"■
2010 GETA$ IFA$<>"N"ANDA$<>"Y"THEN2010
2020 IFA$="N"THENPRINT"J" RETURN
2030 PRINT"■■      INSTRUCTIONS" PRINT"■
2040 PRINT"■DROP THE BEADS DOWN" PRINT"■THE GRID TO FORM A" PRINT"■ROW OF 4"
2050 PRINT"■EITHER VERTICALLY," PRINT"■HORZONITALLY OR" PRINT"■DIAGONALLY"
2060 PRINT"■USE 'CRSR DOWN TO GO" PRINT"■LEFT 'CRSR'RIGHT TO GO"
2070 PRINT"■RIGHT  RETURN  TO DROP" PRINT"■■AND 'SPACE' TO CHECK"
2075 PRINT"'C' ENDS THE GAME"
2080 PRINT"■■■■        ■PRESS SPACE■
2090 GETA$ IFA$<>" "THEN2090
2094 FORP=1TO4 READGH NEXT
2095 READGH RG IFGH=-1THENRESTORE GOTO2100
2097 POKE36876,GH FORP=1TO(RG*200) NEXT POKE36876,0 GOTO2095
2100 PRINT"J" RETURN
```

Programs for the Acorn

When I first saw this package my mind went back to Christmas as a child, receiving attractive boxes containing compendiums of games

One hundred programs for just over £10 is very good value. At 10p per program you would expect quite a lot of programs which exist purely to make the number up. However, apart from the odd one or two, the games represented excellent value for money

The programs are presented in eleven sections, eg, Maths Graphics. I cannot see how anyone could fail to find a wealth of material which he or she could not either use directly or take as the basis for development of a new program

Section 1 seemed the weakest of the eleven. It is more a familiarisation exercise with the Electron than anything else. Section 2 covers the basics of games writing in a way which could form the basis for useful game development by amateur program writers. I particularly liked the *Business* and *At Home* sections which practically give you everything you want from a computer in business, and everything you want at home — from birthdays to investment and back. I couldn't help at this point wishing for a disc version as a lot of this section's programs were in file form

Moving on, there are sections on *Mathematics, Painting on the Screen, Data Handling, Recreation*, The Science Lab (most of it behind me with volumes of solids, colour codes for resistors, moments of inertia etc), *Graphics routines*, and, finally, *For the School*.

If you are looking for a collection of routines to get you started on your Electron, and introduction to a variety of games you can develop, how to check up on your tax, VAT or investments, help in the kitchen or drawing pretty pictures then this could be for you

One point: as a dabbler in programming I would have liked the accompanying descriptive book to give listings of the programs. Still, with one hundred programs to list I suppose it is only natural they print that as a separate book at a separate charge

Fred Short

Program *100 Programs for the Electron* **Price** £11.50 **Micro** Electron **Supplier** Prentice Hall International, London

Spectrum Programming

This combined book and cassette set in the Dr Watson Computer Learning Series is sub-titled *Beginners Basic for the Spectrum*. But it falls between the two stools of getting the real beginner started and helping the more experienced programmer to go further

The book gives its rationale as being to show how complete programs can be written, rather than duplicating the Spectrum manual's admirable cover of specific commands. While it is a worthwhile task, a major disappointment about the set is that it spends far too much time going over ground already well dealt with in the ZX manual

The book has thirteen chapters, twelve of which each develop an original idea for a game through to the finished program. This is where the tape provided can give you a shortcut, as it contains the final versions of the programs developed in these chapters. Although it may be a help to a reviewer hard pressed for time I do think it is more of a gimmick than of much practical use. Most of the programs are simple enough to type in yourself

The final game developed is an adventure game, and this is the only one long enough to justify the inclusion in the set of a pre-recorded tape. The unfortunate thing here was that I couldn't get it to work, as it first stopped with an error message referring to a non-existant line, and then tied my Spectrum into a knot. Switch off, and try again

The book covers very little that isn't covered in the Spectrum manual and it leaves out many of the micro's possibilities

Simon Springett

Program/Book *Spectrum Basic Programming Course* **Price** £10.50 **Micro** Spectrum **Supplier** Honeyfold Software, Standfast House, Bath Place, Barnet, London

Heathrow

Early in *Close Encounters of the Third Kind* a scene at Indiana Air Traffic Control in the unreal glow of radar screens shows tight-eyed men watching appalled as an unauthorised craft tracks through their airspace. To discover for yourself how they felt, spend a day peering at your VDU deciphering tiny white shapes on a screen — running *Heathrow*

Being in charge of planes as they come in to land is like playing 3D chess while driving a dodgem car. Living under a flight path for Heathrow Airport did not help my nerves while I strained to learn the skills of an Air Traffic Controller. Mike Male — the author of the program — is, however, a good teacher. He wrote this program based on his own job at the world's busiest airport

This simulation takes several hours to come to terms with. There are — thank goodness — comprehensive sleeve notes with the cassette and the program has a 15 minute demonstration section running through a sequence of actions on screen while the notes explain what is happening

There are several levels of activity in addition to the demonstration. Each gets progressively busier in the air and the last three include emergencies for you to panic about as the clock ticks steadily on. Thank goodness for a chance to freeze the program and relax — a luxury denied to the real controllers

The program displays on request a page assessing your progress so far based on safety, handling of emergencies and the efficiency with which you get the craft down. It is important to funnel planes in as closely as possible to the real Heathrow's incredible 90 second average gap between landings

This kind of program depends totally on the quality of screen display. *Heathrow* pecks in three sections of information: radar screen, radio instructions and status board. Even with a monitor I found it hard to follow tiny aircraft on the blue radar screen — especially when the code letters they display look similar. Maybe this is why air-traffic controllers in movies tend to wear glasses

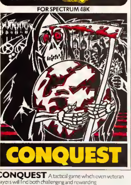
As a veteran of several flight simulators on the BBC B, I expected to pick up *Heathrow* very easily. It is not that kind of program. Indeed there is nothing for the zap, bang instant response wizards in it. Even a nasty crash is unspectacular. But assuming you pay your good money to get the lasting satisfaction of a real challenge — then enjoy this one

Dave and Jan Watterson

Program *Heathrow* **Price** £7.95 **Micro** *BBC/Electron* **Supplier** *Hewson Consultants, 56b Milton Trading Estate, Milton, Abingdon, Oxfordshire*



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Quark, strangeness and charm

Andrew Pennell *takes the first critical look at a production run Sinclair QL computer —one of the first machines to be received by a Sinclair customer earlier this month*

The QL is here and a few lucky people around the country now actually have one

At the launch some four months ago the QL was hailed as the first of a new generation of ndme micros with an amazing specification Since then the worst delivery delays since the BBC micro have tarnished both the image of the computer and that of its designers. Sinclair Now that the machine is at long last in production — the big question must be, is it worth the wait?

Although it's been published many times before it is worth going through the machine s basic specification again It has 128K Ram, 40K Rom a real keyboard very high resolution graphics and a pseudo 32-bit processor As well as all this, two Microdrives are included for mass storage, and four professional programs supplied by Psion All for a paltry £400

The machine doesn t really look that sophisticated from the outside Its not very large or heavy and once again Sinclair has keys are non-standard and the *Ctrl* key is where you would expect the *Shift* key Also it is a real pain to have to hold *Shift* together with "— to obtain underline, which is a very important character on the QL being used as part of the syntax of many commands To delete characters two keys have to be pressed, but as they are adjacent you soon get used to it.

It makes a change for a Sinclair machine to have a large number of sockets for various connections, even if most are non-standard On the left of the keyboard is a blanking plate concealing a very large hole called the expansion slot. Peering into this reveals a large 64-way socket containing all the necessary hardware signals Into this slot will plug any extra hardware, such as Ram packs printer interfaces and disc controllers If you want to plug more than one such item in at a time then you will have to get the QL Expansion Module, which is a sort of motherboard It is not yet available but I think I saw some prototypes in Psion s labs during a visit not long ago At the back of the case on the left is the *Rom* cartridge socket originally intended to take up to 32K of external Rom However, memory restrictions forced the engineers to commandeer half of this space for the Basic so the first customers have ugly little black boxes sticking out containing some 8K of the Basic in Eprom (see *PCW* April 26) When the final Roms are ready this "bodge-BASIC in Eprom (see *PCW* April 26) When the final Roms are realy this "bodge-board will not be necessary but, until that time, no other *Rom* cartridges can be plugged in This unforseen design modification has also meant that when the Eprom is incorporated into the main board it will still only be possible to plug in a maximum of 16K bf Rom via the socket — halt the intended amount

Next to the Rom port along the back are two so-called joystick sockets Instead of using the industry standard 9-pin D-type socket as used by most joysticks, the designers deliberately chose a very unusual type of connector just to make life difficult If you actually want to plug a joystick in, you will have to fork out extra cash for a special adaptor The cost and availability of this adaptor is, naturally, not known at this time The type of socket used is mechanically the same as that found on the new British Telecom telephones, but electrically different.

Next to the joystick sockets are two RS232 ports for the connection of most other peripherals such as printers or a modem Unfortunately, most printers nowadays are Centronics or parallel connection types so you will need an adaptor of some sort Apparently a suitable interface will be available from Sinclair but I



wouldn't recommend you hold your breath waiting for it

There are also sockets for the domestic tv, black-and-white monitor and RGB colour monitor at standard voltage levels with an almost-standard socket.

There are also two network sockets for connection to other QLs or Spectrums and a blanked off extension Microdrive socket

Lastly at the front of the QL on the right are two small slots into which the famous (or infamous) microdrive cartridges go Opening the case revealed a surprisingly neat circuit board with absolutely no modifications on it. Populating the board are fewer chips (excluding Ram) than in the ZX80 — two processors 16 Ram chips two custom ULAs two Eproms and a few TTL chips

On powering up the QL, you are greeted with a 1983 copyright message (showing just how late it is) together with a request to press function key *F1* or *F2*, depending on

which kind of display device you use

If you are using a monitor, the screen is divided into 3 windows with 80 characters per line. If you are using a TV, it changes into 40 character mode with two of the windows superimposed. Each of the three windows is a self-contained section of screen, each with independant position and attributes.

When you type in a line it appears in the five-line window at the bottom of the screen. Program listings appear in the top left, and printouts from programs which have been run appear on the top right windows. Unfortunately, if on power-up you choose the tv display option, rather than monitor, the list and print windows are displayed one on top of the other which makes things very confusing. I was not very impressed with the display quality on my own JVC telly, which was a bit fuzzy and had the annoying habd of flicking to black-and-white.

The screen has two modes, either medium-or high-resolution. In medium resolution there are eight colours available on screen, with hardware flashing. The resolution is 256x256 pixels, with none of the colour clash problems of the Spectrum or the serial attribute problems of the Oric. Unlike the Beeb, the fact that the screen uses a whopping 32K of RAM is not very significant and it still leaves over 90K to the user.

In high-resolution mode, there are four-colours at a resolution of 512 x 256 pixels. The full range of 32, 40, 64 or 80 characters per line are available, again in single- or double-height, but with no *Flash*.

Typing in Basic programs is not really as easy as it could have been, as the so-called syntax checker is awful. When you hit *Enter* after typing or editing a line, the machine checks the line for obvious mistakes, and if it finds one it rejects it with the message "bad line". Regrettrably, there is no way of retrieving the bad line to edit the mistake — the whole thing has to be re-typed. It doesn't really syntax check anyway, so a line mistyped as

```
10 PRINY A
```

is accepted, as it assumes you could be about to define a procedure called PRINY. I prefer no syntax checking at all to the way the QL does it.

The Basic is one of the reasons for the long delay in finishing the machine, and is still the weak link in it. It originally had such a good specification that it all proved too difficult and time-consuming to complete. As a result, some of the commands referred to in the Provisional Manual have been dropped, while other easier-to-implement commands have been supplemented.

Superbasic itself initially proved tricky for me to use, as the sections of the manual describing it are not yet ready and the machine was sent out without a Basic manual.

It has all of the structured programming commands of the Beeb — namely *Repeat*, Procedures, multi-line functions, and a *Select* statement, an improvement over Pascal's *Case*. The best part of Superbasic is its graphics, which are mind-blowingly fast. It can plot points, draw arcs, circles and ellipses, pixel scroll parts of the screen in any direction, and fill shapes extremely quickly. Although the *Fill* algorithm is not very complex, it is very fast, and plotting off the screen no longer produces the annoying "Integer out of range" response — as on the Spectrum. There is also a *Recol* command, to simulate a colour pallettes. To obtain more colours, the QL uses stipples, which are patterns of colours, to obtain different shades.

Curiously there is no way of reading the colour of pixels or characters from the screen (ie, *Point* and *Screen$* on the Spectrum). The Beep command has many parameters and good sound effects can be obtained. The output level is thankfully better than the Spectrums, but not as loud as the Beeb or the deafening Oric. Since there is no audio output socket on the QL, you can't pipe the sound through your monitor speaker, or any amplifier for that matter. Accessable using the *Dates* command is the internal clock. It not only stores the time, but the day, month and year. Unfortunately, the value of the clock is not preserved when the power is removed. Nice features sorely missing from previous Sinclair dialects are integer variables, arrays starting at 0, *Auto*, *Renumber*, binary operations, double and quadrouple *Peek* and *Poke*, and line delete.

A major QL feature is windowing, and works by defining different streams to different screen sections. Such 'windows' can be used to good effect, but are not up to concurrent CP/M or Lisa standard. One much advertised feature of the QL is multi-tasking but this remains untested. As no technical information on QDOS — the QL microdrive operating system — is yet available, nothing can be said about it. The only known feature of QDOS is that it can recognise external peripherals, such as disc drives, and that most machine-code on the QL has to be postition independant. In addition, networking to a Spectrum proved to be almost impossible as the protocols do not seem the same.

As the QL uses one of the latest state-of-the-art processors, the 68008, I was expecting the Basic to be very fast. After running the standard benchmarks, however I was rather disappointed, though it is thankfully faster the Spectrum. The QL is around one and a half times slower than the Beeb and the Amstrad, except when number crunching. Only one benchmark was faster, and it involved a lot of maths functions. It would appear that the priority when writing Superbasic was elegance.

After all the changes, Superbasic is still good — if disappointingly slow. It has all the features of the previous best, namely BBC Basic (except the Assembler), with lots of additions. I personally mourn the demise of the *When* and *Trace* commands from the original QL spec though.

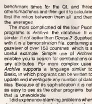
Most sceptics seem to think the weak link in the QL's design is its use of Microdrives, and I used to agree with them. However, QDOS handles them so cleverly that they are almost as good as true discs. Their speed is faster than some disc systems, namely the notorious Apple and Commodore ones, and equals many others. Unlike the ZX variants, they can handle random-access. Only time will tell about reliability, but their predecessors, the ZX Spectrum ones, have now proved themselves and my Microdrives are far more reliable than my Apple discs. As if to prove this, after typing half this review into my Apple the disc drive decided to crash, losing all my text, so I have re-typed it into my more reliable Spectrum with *Tasword*, and saved it on Microdrive. The Microdrive's only (easily curable) fault is the cartridge cost. Four pounds 95p is simply extortionate for 100K of media, and the price must come down.

The only problem I found with the QL

Exclusive Review

drives was the curious way in which the write-protect tab functioned When writing to a protected cartridge, instead of getting an error, nothing happens You are given the impression that your file was saved successfully when in fact it wasn't.

For many, the major attraction of the QL is the four applications programs supplied with it, written by Psion Each is supplied on a microdrive cartridge and four blank cartridges are also supplied on which back-ups should immediately be made. The first part of the provisional manual says the *Exec* command should be used to load them, but it only results in the machine crashing Further on in the manual the correct loading instructions are given but the misprint is sure to cause a few customers to immediately return their QLs because "they won't load anything". The manual also says they take 'a few seconds to load In fact, the fastest any loaded in was a minute



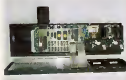


Once loaded the program cartridge always has to remain in Drive 1 with a formatted cartridge in Drive 2 This is because 128K Ram is insufficient, and they sometimes have to load in particular sections for some options In addition, *Quill* the word processor, also seems to use the second cartridge as some form of temporary storage All the programs share a similar on-screen format with helpful screen prompts, selectable character widths and a *Help* facility available at any time by pressing function key *F1*

Of the four programs, *Quill* will probably be the most useful to the average user As word-processors on home micros go it is almost certainly the best though it does have some strange omissions It uses the what-you-see-is what-you-get principle (or WYSIWYG), and performs all justification, margin setting and selection of typefaces while you type very neatly Changing any of the attributes is very easy using the prompts and you can change the number of characters per line to suit a TV or a monitor Forty-column mode is useless on a tv, because you can't see the edges, while 64 is ideal and 80 is fine for a monitor There is a printer configure program on the *Quill* cartridge with a limited choice of printers at the moment — either Epson FX80 or anything else If you don't have an FX80 (or an RX80) then you have to define your printer control characters for different functions — in a similar way to *Tasword* on the Spectrum I feel the major omission in *Quill* is the limited control characters you can send to your printer

The manual refers to a *View* facility that enables you to see very wide documents on the screen but it seems to have been removed from the program without anybody telling the manual's author Apart from QDOS problems that I shall mention later, the only bug I found was pressing *Esc* to terminate printing actually caused the machine to lock up — a bug that surely should have been corrected long ago

Easel is the graphics package which represents data in graphical form, using bar charts or pie charts It is dead easy to use — you just type in your data (or import it from another of the four packages), and it immediately draws the graph If you don't like the format chosen it can be changed though pie charts are very slow to draw Assuming you have typed in your bate and got the graph you want what can you do with it? The easiest way to get an image of it would seem to be to photograph the screen, and the manual tells you how best to go about it The alternative is to dump the graph to your printer but if you haven't got an Epson FX/RX 80 then too bad! Luckily I have an RX80 with RS232 card so I was able to test the facility and it works really well, if a little slow Each screen colour is printed as a different shade, giving a very clear output If you plotted your graph in 8 colour mode it gets converted to 4-colour before printing



Abacus is the spreadsheet which the average user is likely to leave well alone just as I did to start off That's because you may think that they are only useful for financial forecasting After reading the examples in the manual though, you soon realise how useful a spreadsheet can be for all sorts of things I used it to store benchmark times for the QL and three others machines and then got it to calculate first the ratios between them all and then the averages

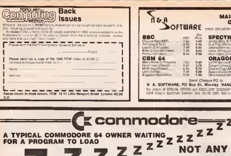
The most complicated of the four Psion programs is *Archive* the database It is similar if not better than *Dbase 2* Supplied with it is a demonstration file containing a gazeteer of over 150 countries which is a useful example Simple use of *Archive* enables you to search for combinations of any attributes For more complex uses *Archive* supports a language similar to Basic, in which programs can be written to update and investigate any number of data files Because of its sophistication it is not as easy to use as the other programs but that is unavoidable

I did experience alarming problems when doing certain input/output operations from all the applications which leads me to think that there are still problems in QDOS Files saved on cartridge often refused to completely load back and the machine would just hang up in the middle of loading It would also seem that Psion did not use as much of QDOS as they should

In conclusion the QL is pretty damn good With a few modifications, though it could have been superb The machine and the applications programs together represent excellent value for money, but the Basic is a little disappointing I hope when Sinclair upgrades Eprom customers it will take the opportunity to improve some of the Basic features particularly the "syntas checker"

The good points of the QL far outweigh the bad, but it does have its disadvantages — a cartridge cost of £4 95 and problems of machine availability being but two The incompatible joystick "sockets" are an outright con and a joystick adaptor should have been the "free" gift and not an RS232 lead

And one question still remains unanswered — why was it launched six months before it should have been — when the design was still far from complete? What excuse is there for such a premature announcement which has led to adverse publicity for the machine and much ill will from potential customers?



PCW concludes the education series with a review of Commodore software, programs for use in secondary schools on the BBC and a section on software for the disabled

It all adds up

***David Lawrence** looks at the latest education programs from Commodore*

With a comparative hush hanging over the software market recently, one of the few areas that continues to attract attention and a great deal of investment is education Most of the larger book publishers are heavily promoting ranges of educational programs and not to be outdone, Commodore have turned their attention to a new range of ideas for the 64 All the programs, as you would expect from the makers of the machine, show a good awareness of the 64's outstanding sound and graphics capabilities, though some show signs that they were rushed out when a little more thought could have improved them

Number Puzzler is a case in point. Originally created by A S K, the title has been bought by Commodore and altered slightly for the 64

Within one program are a set of extremely well worked out number games based on noughts and crosses or magic squares (where all the lines, in any direction add up to the same total) In the simplest noughts and crosses version you are presented with a 3 x 3 grid of single digit numbers. Each of the two players (the 64 will play you if you want) is presented with two numbers that are either on the grid or can be added up to form a number on the grid The player responds by saying whether the numbers are to be taken separately or added together As a result either one or two numbers on the grid are changed to the player's colour When a player completes a line in his or her colour, that round of the game is over and when one player wins five rounds the game ends

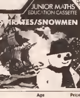
Tester Barny (aged seven) soon realised the need both to plan ahead and to ensure that the numbers were examined separately and when added together In other words the game succeeded in making him think and calculate, which is more than can be said of many The 6 x 6 game, with numbers up to 99 involving addition and subtraction would be a challenge for anyone

For all that, the program was marred by two features. Firstly, whenever one of the five forms was entered, it appeared impossible to return to the main menu In other words, to access one of the other games, the tape had to be loaded again Hardly an attractive feature at seven minutes a time In fact, instructions for later games revealed that it was possible by use of the Control/B keys, but the omission of this from the instructions will spoil the package for many The other flaw, common to many programs, is that programmers normally work on high quality monitors which are capable of doing justice to the range of colours the 64 produces Not all domestic sets can since colour bleeds from left to right on the screen, losing delicate shades on strong backgrounds. We found the change in colour in the numbers of one player, from white to light yellow on a brown background almost impossible to distinguish As a package we enjoyed *Number Puzzler* but as I say, I can't help thinking that a month later it might have been much more impressive

Sprites and *Snowmen* was an immediate hit Both the games are competitions for two players where success depends upon the ability to answer questions quickly and accurately In all such games the success or otherwise of the idea depends upon how it is dressed up In *Snowmen* you answer questions in the middle of a blizzard and all the time your question goes unanswered, your opponent's snowman grows The game has 18 levels of play, nine for addition and nine for multiplication, allowing a fair balance to be struck between two players of almost any age group *Spirates* doesn't have the same flexibility in terms of levels of play but the scene is an enjoyable one nevertheless with two pirate ships loosing off cannon balls at each other across the bay with success depending upon quickness and accuracy in answering

Let's Count, another ex-ASK package which consists of beginners counting and number matching games set in such unlikely places as treasure islands space stations and funfairs was excellent in every way The graphics and sound were superb with imaginative use of sprites throughout and the ideas which seemed a little naive to me, intrigued Barny even though most were a little young for him What impressed me most of all however, was that at three and a half years old tester Tom found the simpler games gripping and possible to play, a tribute to the range built in

All in all, high marks for these first packages in the new series but I can't help thinking that Commodore's testing procedures need to be toughened up a little



Supplier	Game	Age	Price
Commodore Business Machines	*Number Puzzler*	5-11	£4 99
675 Ajax Avenue	*Spirates and Snowmen*	5-11	£4 99
Slough Trading Estate	*Let's Count*	5-11	£9 99
Slough	(two-cassette package)		
Berkshire			

Making faces

***Keith and Stevan Brain** survey a selection for the 64 from independent publishers*

Commodore have recently put a great deal of efforts into getting the Commodore 64 into schools so it is obviously interesting to see what sort of educational software is available

Fun to learn on the 64 from Shards Software is a compendium of five different educational games This is a very long program and loading seems to take for ever, thanks to the incredibly slow baud (or should read "bored"?) rate of the Commodore cassette interface, but eventually you are requested to enter your name and a menu of six options puts a particular letter on the screen a variable number of times, and asks you to count how many copies are present. Obviously pretty basic stuff but at least they have made it more useful by telling you whether you were close or not, and rating your response time Obviously pretty basic stuff, but at least they have made it more useful by telling you whether you were close or not, and rating your response time There is a great temptation in the end to just guess rather than bothering to count! The whole package is well integrated so that there is ample opportunity to get back to the main menu when you tire of any particular game None of the options are impressive in their own right but put together on one tape they cover several different educational con-

continued over the page ▶

cepts and probably represent reasonable value for money

Identikit from Stell is a very polished and entertaining affair from a company specialising in educational software The game



revolves around building up faces on the screen in identikit fashion from a selection of alternatives displayed on the screen The first stage is to select a feature (eg, eyes) and then select a particular shape for this feature from the list provided At the start of the program you can also call up a 'colour' option which allows you to specify any of 15 colours for each feature as it is selected Once the choice is made that feature slides smoothly across the screen into the appropriate position on the face

Only two keys (spacebar and return) are used by the face creation program, so that it is suitable for even the youngest child, and it is claimed that 15,000 different faces can be created (although we don t like the look of some of them!) Once a face has been created it can be animated so that it smiles, frowns winks, wiggles its ears, or even moves everything at the same time with hilarious results. You can also choose to try a memory test which shows you a face for 30 seconbs, and then allows you one minute to recreate the same face It is billed as 'an entertaining introduction to the computer for 2-6 year olds rather than making any particular educational claims, although it obviously teaches shape recognition and pattern matching A very professional package

Maths Invaders is another impressive program from Stell which combines arcade-style machine-code graphic action and sound with learning your maths Rows of invaders containing maths questions (the ultimate weapon?) move down the screen in traditional style and you can only stop them by loading your gun with the correct answer and firing it at the corresponding alien A mother ship scurries back and forth renewing the ranks and there are a total of three waves each of 15 questions in each game Addition, subtraction, multiplication and division can be selected separately or in any combination, and you can even choose different skill levels for each type of question!

This certainly puts some fun into learning maths, but the complete absence of any method of scoring points is rather a disappointment. Successfully zapping all the answers just takes you back to the title page If parents can stand the noise then the kids will certainly enjoy this way of learning

Typing Wizard from Severn Software is rather different in that it is an undoubtedly educational but very serious aid to learning to type An introduction to the system is provided and then there are six different lessons dealing with the various areas of the keyboard, a lesson dealing with the entire keyboard, and finally a speed test. An accurate picture of the keyboard and the position of your fingers is provided together with a series of suitable exercises at each stage The F7 key is used to step through the program (if you can find an eleventh finger) The ability to touch type is obviously useful and this well-designed package provides a painless way of developing the skill

Supplier	Program	Age	Price
Shards Software 189 Eton Road Ilford Essex	*Fun to Learn on the 64*	6-12	£6 95
Stell Software 36 Limefield Avenue Whalley Lancashire BB6 9RJ1	*Identikit* *Maths Invaders*	2-8 4-12	£7 95 £7 95
Severn Software 5 School Crescent Lydney Gloucestershire	*Typing Wizard*	general	£6 90

Down to business

***John Scriven** discusses BBC software for use in secondary schools*

In the last review I looked at a selection of the software that was available for younger users of the BBC micro This week I shall be looking at those packages designed for older users although the boundary between these two groups is of course, very flexible

There a more provision for programs that model computers in the real world than there used to be, but it is still an area that is to some degree lacking There are database programs offered in both the primary and secondary MEP packs, and these are useful in many ways If children build up their own databases of traffic surveys or census returns they not only learn about databases but can also tackle subjects that would be too complicated or time-consuming using traditional methods.

One of the more enterprising programs in this week's selection is *DBS* a database package from MUSE. Anyone who is at all interested in educational computing would find joining MUSE (Micro Users in Secondary Education) an excellent investment, as the range of software they can supply covers most disciplines and all age ranges They have 300 titles in their catalogue on cassette and disc and these are written for ZX81s, Spectrums, 380Zs, Apples and Pets as well as BBC machines MUSE also offer courses in different aspects of educational computing

DBS is a full feature database program that goes a lot further than *DBASE* in the MEP pack (which schools acquired along with their subsidised BBCs in the DES scheme in 1982 and 1983) *DBS* is split into several subprograms that are loaded from the disc as and when they are required The menu program allows you to choose whether to initialise a new data file, edit or sort existing files or search for an entry A 100K disc can contain about 400 records, each of up to eight fields of up to 25 characters When you edit the file, you are allowed to add, delete, list find or alter each record and the display shows clearly the limits within which you can operate Sorting allows you to choose the field, unlike some inferior programs eg, if you were sorting names, addresses towns and telephone numbers, you could sort in alphabetic order of names or in order of the towns

When it comes to searching the database, you can specify in great detail the requirements of the search Using the previous example you could ask to see all

the records that contain names beginning with A but not ending in S that live in London and Liverpool Files can be stored in their new forms and the results can be sent to any parallel printer The documentation is adequate and the whole package would be useful in both the classroom and in administration

The secondary programs from MUSE are also of a high standard, and include several written by Adnan Oldknow, including *Games* and *3D Glass* is an elementary CAD program (computer aided design) that allows the user to design a drinking glass Coordinates are entered on one side of a graph and when the drawing mode is selected, the whole glass appears in three dimensions The shape can then be altered by changing or adding other coordinates

The second program *3D* also relies on graphics, and shows how a design can be rotated reflected enlarged stretched sheared and viewed from almost any angle Objects to be viewed include a variety of polyhedrons and a house As the program is menu-driven from a text window at the base of the screen, it is easy to see the effect of different commands in a way that would be impossible without a computer My one complaint about the program is that there is no way to enter your own data for objects partly due no doubt to the limited amount of memory left by the BBC in high-resolution modes

Although many ambitious science departments already use the BBC micro in experiments, there is some ready-made software available *Pendulum* from MUSE allows the movement of a simple pendulum to be shown on the screen The making of the pendulum is described in the detailed notes and this is attached to a potentiometer that is connected in turn to the A/D socket on the BBC A graph of amplitude against time is drawn and the length of the arm can be varied and the differences in frequency noted This program would be ideal for both teachers and pupils coming to computers in control for the first time

One area that seems well-off for software is that of chemistry *Forensic* from MUSE applies basic chemical analysis to a murder enquiry You are presented with four suspects, and you have to analyse substances found on their shoes You can carry out flame tests, see what happens when you add hydrochloric acid, silver nitrate etc as well as seeing the results of paper chromatography appear in front of you

Safety is an important consideration in science, and the Health and Safety regulations now make it impossible to carry out many traditional experiments in the laboratory This must be a good idea, as I remember with a certain amount of horror crowding round the front bench to watch oxygen burning in an atmosphere of hydrogen Computers can come into their own in the field of simulations, and this fact is used by Acornsoft in some of their programs

Chemical Simulations contains three programs *IR PH* and *Organal* *IR* simulates an infra-red spectrometer and starts off by giving basic facts about IR spectra including a table of the sort of peaks to be expected with different compounds Next a compound is selected at random and its spectrum drawn

PH plots titration curves between strong and weak acids and bases and also tests you on calculations through a series of multiple choice questions The last program, *Organal* is a detailed simulation of an organic analysis and is similar to *Forensic* but considerably more complex. There are three sections, basic reaction tests revision of reactions and the actual simulation After being given an unknown compound you perform tests and the results are recorded in a laboratory notebook You can check up on reactions at any time and eventually enter your guess at the identity of the compound The documentation is first class, and includes pupils notes

Another set of simulations aimed at students comes from Hama software

As an example I have been looking at *Stock Control*, which consists of two cassettes and an accompanying booklet The first program demonstrates the calculations necessary to make sure that you order a sufficient number of units without overstocking Graphs of order size against cost are drawn and the results of changing any of the parameters are instantly seen Various factors such as cost of insurance labour, material and spoilage need to be taken into consideration as well as transport and the cost of using up valuable storage space

Running a business is shown to be far from simple and the program offers a safe way to learn the ropes (Computer bankruptcy is comparatively painless!) The second program enables the user to simulate seasonal variations in a similar program, and this is extended to cover a 48 week year As well as giving a theoretical background to the problem the documentation gives many examples and makes a complex subject reasonably comprehensible The programs could even be given figures from a real life situation to provide the answers to "what if" questions that would usually only be available from spreadsheet programs This type of business program is usually only available for business micros which may explain the high price, but colleges may find the usefulness justifies the initial outlay

This review has only covered a small selection of the software available for the BBC I have avoided those programs such as Adventures and logic games from *Connect Four* to *Chess*, which are far more "educational" than many bearing that title It is clear that there is a move away from merely using the computer as a teaching machine something to be admired

Supplier	Program	Price
Acornsoft c/o Vector Marketing Denington Estate Wellingborough Northants NN8 2RL	*Chemical Simulations* *Chemical Structures*	£13.80 £13.80
MUSE PO Box 43 Hull HU1 2HD	*DBS* (disc) *3D* *Glass* *Pendulum* *Forensic*	£20 00 £10 00 £10 00 £7 00 £7 00
HaMa Software 44-48 Magdalen Street Norwich NR3 1JE	*Calpax Twin Programs* *Stock Control* *Network Analysis* *Business Stats*	 £43 00 £43 00 £26 00

(Unless otherwise stated all software is available on cassette, but disc versions are usually available)

Simply ingenious

***Robert Dawson** scans a range of software and peripherals for the disabled*

Feeling rather spoilt for choice with this selection I started by loading the Ega Beva *Catalogue* and was shortly greeted with a very enthusiastic looking beaver wearing a mortar board and a toothy grin The remainder of the tape contains a catalogue of the S E S S product range with price list and includes an overview, with aims of each of the educational programs

In an attempt to capture the interest of my wayward two and a half year old daughter I immediately went on to the *Snap* series "for the pre-reading child" The object is to respond to a matching situation *Colour Snap* has seven graded games that present a variety of coloured shapes in various combinations (carefully avoiding shape/colour association) with a reward presented for selecting a matching colour when it appears alongside

In any educational situation the reward for correct learning and response must be totally appropriate The blend of skills of the S E S S staff as teachers and programmers became apparent at once The rewards to correct selections make full use of the BBC s sound colour and graphics in the most delightfully entertaining way Familiar nursery rhymes and popular tunes are associated with bold, colourful and easily identifiable pictures

To make responses easier for the younger or less able child who has not yet grasped the relationship of all the keys on the keyboard all actions are entered by pressing the space bar That being the largest and most obvious key available this in itself is typical of the care running through the whole suite of programs

My daughter was by now jumping up and down on my knee thrilled by the dog wagging its tail (to the tune of "How Much is That Doggy in the Window) and disappointed by the computer equivalent of a gentlemanly raspberry at her mistakes

My next attempt to gain her interest in the screen and keyboard met with less success (due mainly to the jump in appreciation) but left me very impressed with what can be achieved using the BBC sound facilities This cassette was the *Nursery Rhyme* collection

I found the counter point harmony (or maybe it was descant) in *Twinkle Twinkle Little Star* quite captivating and I am sure that it will be a family bedtime favourite

I would however level one of my few criticisms of the review at the loss of opportunity of having the words either changing colour flashing or having a little dot marching along them as a cue

To digress briefly I recollect a "craze" at school for those plastic sliding block puzzles that had numbers or a picture on them.

Ega Beva have taken this principle and applied it with tremendous success to the computer screen in their *Sliding Block* and *Jigsaw Puzzles* It starts by presenting a picture (or you can use one of your own creation) and then after you have had time to memorise it splitting it up into a matrix, jumbling the pieces and blanking the bottom right hand corner The dimensions of the matrix depend on the level that has been selected

However, it is one of the most absorbing programs that I have come across and is much loved by handicapped children Apparently, even mentally handicapped children will concentrate for nearly an hour (which is normally very difficult to achieve) to sort out the pieces and get the reward of a complete picture of a steam engine and a verse of "She ll Be Coming Round the Mountain When She Comes"

It encourages dialogue in groups of children, special awareness in the mentally handicapped and hand-eye coordination in the physically handicapped in manipulating the cursor control keys (or whatever device is used to replace them) It is a brilliant concept.

The *Abacus* program in the *Maths Pack* deserves a special mention It is based on two big brightly coloured abaci with colour coded beads It teaches adding and subtracting by moving the beads from one to the other and prompting for a manual 'carry over with the space bar

The *Concept Keyboard* made by Star Microterminals Ltd is a data input keyboard which is widely used in educational establishments for the handicapped. It consists of an A4 sized wipe clean membrane with an 8 by 16 matrix of touch sensitive switches beneath it.

This matrix is totally software decoded within the computer and can represent anything from 128 ASCII coded keys down to one or two sensitive blocks of keys This, with the appropriate overlays, makes it suitable for use by anybody with either the finest or the most gross of movements An A3 sized keyboard is now available to increase the range of application

The *Micro Mike* is basically a CB microphone with a small amplifier that plugs into the analogue to digital convertor port on the BBC That in itself is not outstanding but the software written to run with this is of the same quality and displays the same creative thought as the remainder of the Ega Beva range The sight of a stalwart member of the medical profession lying on the floor and bellowing "GO GO GO" into the microphone to control his boat speeding up a rock infested river is testimony to the absorption that can be induced by this combination

Simple fascination was the response to talking into the microphone and producing a city skyline on the screen formed from a speech volume/time graph in a variety of colours

All of these voice operated games could be recommended for teaching coordination to people with speech impairment

The *Utilities Pack* contains six useful routines that can be included in a variety of programs

These include the routines to configure the BBC to operate with the *Concept Keyboard* and to interface the *Micro Mike*

The *Micro Mike* and *Concept Keyboard* with their associated programs are a first class way of bringing educational entertainment to the physically or mentally handicapped child

Overall, this is a suite of programs that would come in for a lot of use in any imaginative educational situation for the young or disabled

The Micro Mike

Supplier	Program	Age	Price
Ega Beva Software (S E S S Ltd)	*Colour Snap*	pre-school	£11.95
Central Trading Estate	*Nursery Rhymes*	pre-school	£9.95
275-277 Bath Road	*Jigsaw Puzzle*	primary	£9.95
Bristol	*Sliding Block Puzzle*	primary	£9.95
BS4 3EH	*Maths Pack*	5-11	£11.95
	Utilities Pack	general	£7.95
Star Microterminals	*Concept Keyboard*	general	
22 Hyde Street	(A4)		£74.75
Winchester	(A3)		£108.25
Hants	(lead)		£9.20
Ega Beva Software (S E S S Ltd)	*Micro Mike*	general	£28.75

Someone, somewhere

***David Lawrence** presents the first in a series of articles about networks and bulletin boards*

Long distance communication exercises a fascination for human beings. From pen pals to amateur radio there seems to be something irresistible about the idea of talking to people without seeing them face to face. Now, with the spread of the low cost micro, increasing numbers of people are discovering the fascination of a new form of communication known as "telephone networking": human beings talking to human beings through the medium of computers or simply human beings talking to computers.

Next week I shall talk about some of the practical requirements that I have found as a complete beginner to be necessary to embark on networking. In this first article we shall take a look, not at the technicalities but why people are talking via computers.

As I write this it's Sunday afternoon in Oxford. Before I go any further I'm going to make up a little file on the word processor, consisting of the following:

"I'm writing a short article for *Popular Computing Weekly* on the joys of networking. This is a test of how quickly I can get responses to messages from around the country. Could anyone reading it please leave a short acknowledgement."

Having done that, I'll leave the article for a while to make a few short phone calls — the time is 1340.

Intermission

It's now later in the day. Earlier I spent about five minutes leaving the message in three different locations around the country, one in Liverpool and the other two in London.

Locations? Well, the country is increasingly dotted with either altruistic or just plain crazy people who run what are known as "Bulletin Boards" — computer systems which answer the phone and allow the machine at the other end to access their information or to send information. All of these are totally free to the users and allow them to leave private or public messages or to read the messages left by others.

If that sounds fairly dull, what it means is the opportunity to exchange information with a large number of people for the cost of one or two short phone calls — simply leave your message, either addressed to everyone or to a named individual, and you can get a response to most problems. To ensure that messages are seen by those who will be interested in them most Bulletin Boards divide the messages that come in into "Special Interest Groups" covering the whole range from useful technical information on popular machines to one board in London which carries users' reviews of good places to eat.

The Bulletin Boards are simplicity itself to use, once you have the experience of a couple of calls behind you. Having dialled the number and switched on the "modem" that allows your micro to communicate with the one at the other end of the line, it is as if someone is running a program on *your* machine. Menus appear on the screen allowing you to make choices between the different facilities like this one taken from a board in the London area (see Fig 1).

Not all networking concerns the amateur Bulletin Boards, however. With a decent modem and the right software there are powerful systems like British Telecom's Prestel with a host of facilities and local telephone numbers covering most of the country. Organisations like Micronet which is accessed through Prestel, provide facilities specifically directed at micro owners at remarkably low cost. With every week that passes there is more at the end of a telephone line for those with a limited amount of equipment to play with.

Anyway, the time is now 2030 so it's time for me to phone around the three boards and see what the result of the message earlier was. ... In all I have 11 replies, simple messages like Figure 2 which was left in the Liverpool Mailbox and Figure 3 which came to me from London.

If I had asked a technical question there might not have been so many replies so quickly but they would have come. That's the joy of telephone networking. My three calls cost me around 25p in total but if I left the messages on the three boards for a few days that 25p would mean them being read by perhaps hundreds of people from all over the country. And even if they can't help, it's always nice just to hear from someone!

Figure 1

```
Bulletin Board Main Menu
------------------------

<R>ead ... Read Msgs on TBBS board
<Q>uick-scan Msgs on TBBS board
<L>eave ... Leave Msg on TBBS board
<M>ail ... Electronic Mail Section
<S>IGS ... Special Interest Groups
<T>ime ... Elapsed Time
<G>oodbye ... Terminate Session
<I>nfo ... System Information
<D>ownload Programs
<$>Upload ... Submit programs
<F>ormat ... Reconfigure terminal
<X>pert ... Change user level
<C>hat ... Talk to SYSOP
<P>assword .... Change your password

Command: g
```

Figure 2

```
Msg#: 4761 *TBBS*
04/29/84 16:21:49 (Read 1 Times)
From: WALT DAVIDSON
To: DAVID LAWRENCE
Subj: REPLY TO MSG# 4759 (NETWORKING)
Hi David.  Read your message with interest
here in Swansea.  Willlook out for your
article.  Regards, Walt (GW3NYY).
```

Figure 3

```
Msg#: 5380 *GENERAL*
04/29/84 17:32:53 (Read 2 Times)
From: DAN O BRIEN
To: DAVID LAWRENCE
Subj: REPLY TO MSG# 5376 (NETWORKING)
Sure  thing.  An  incredible  one-hour
delay for a  message  from Chelmsford,Essex
And they said it was just a puerile hobby...
```

Figure 4

```
Logged on at 23:46:14
Logged off at 23:53:27

Thanks for calling the Bulletin Board
Please Hang Up Now
```

Fast forward

***Alan Turnbull** explains how to speed up cassette loading*

This article introduces two machine code routines for use on the 48K ZX Spectrum which enable the user to operate the cassette interface at a speed of approximately 4500 baud as opposed to the normal 1500 baud. The two routines are essentially copies of the *SA—BYTES* and *LD—BYTES* routines (see Ian Logan's *Spectrum Rom Disassembly*) found in the 16K Read Only Memory (Rom) but with certain 'timing constants' altered.

Figure 1 shows the relevant addresses in the Rom that have to be altered for various baud rates whilst Figure 2 shows the two modified Rom routines, moved up into Ram and set up for 4500 baud.

The routines have been assembled, with the use of Hisoft's *Devpac*, in the 'expansion' Ram area of the Spectrum memory map at addresses 32768 onwards because of a technical detail which causes the malfunction of machine code routines which rely on critical timing. Any such routine placed in the memory area 16384–32767 will fail to work correctly because the Ferranti Uncommitted Logic Array (ULA) interrupts the Z80 Central Processing unit (CPU) while it processes the video information.

For those readers ambitious enough, it should be possible to program a 128K (16K by 8 bit) Erasable Programmable Read Only Memory (Eprom) (for example Intel 27128) to permanently provide a 4500 baud cassette interface, correct the existing errors in the Spectrum Rom and provide a few extra commands.

Figure 1

ADDRESSES OF LOCATIONS TO BE ALTERED IN THE

ZX SPECTRUM ROM AND VALUES TO PROVIDE VARIOUS BAUD RATES

FOR THE CASSETTE INTERFACE

ADDRESS	1500 BAUD	3000 BAUD	4500 BAUD
04F0	3B	1E	14
0513	42	21	16
051F	3E	1F	15
052E	31	19	10
05A6	B0	58	3B
05C7	B2	59	3B
05CF	CB	66	44
05D4	B0	58	3B
05E8	16	0B	07

```
*HISOFT GENS3A ASSEMBLER*
      ZX SPECTRUM

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Pass 1 errors  00

          10 * Machine-code routines for the
          20 * 48K ZX Spectrum to provide a
          30 * 4500 Baud cassette interface.
          40 *
          50 * Alan Turnbull 1984.
          60 *
          70 *
          80 *
          90 *
         100 * 4500 BAUD SA_BYTES ROUTINE
         110 *
         120 * (IX) = START ADDRESS
         130 * (DE) = LENGTH
         140 *  (A) =   0 = HEADER
         150 *  (A) = 255 = DATA
         160 *
         170 *
```

```
8000          180        ORG  32768
8000 213F05   190 L04C2  LD   HL,#053F
8003 E5       200        PUSH HL
8004 21801F   210        LD   HL,#1F80
8007 CB7F     220        BIT  7,A
8009 2803     230        JR   Z,L04D0
800B 21980C   240        LD   HL,#0C98
800E 08       250 L04D0  EX   AF,AF'
800F 13       260        INC  DE
8010 DD2B     270        DEC  IX
8012 F3       280        DI
8013 3E02     290        LD   A,#02
8015 47       300        LD   B,A
8016 10FE     310 L04D8  DJNZ L04D8
8018 D3FE     320        OUT  (#FE),A
801A EE0F     330        XOR  #0F
801C 06A4     340        LD   B,#A4
801E 2D       350        DEC  L
801F 20F5     360        JR   NZ,L04D8
8021 05       370        DEC  B
8022 25       380        DEC  H
8023 F21680   390        JP   P,L04D8
8026 062F     400        LD   B,#2F
8028 10FE     410 L04EA  DJNZ L04EA
```

```
802A D3FE     420        OUT  (#FE),A
802C 3E05     430        LD   A,#05
802E 0637     440        LD   B,#37
8030 10FE     450 L04F2  DJNZ L04F2
8032 D3FE     460        OUT  (#FE),A
8034 010E14   470        LD   BC,#140E
8037 08       480        EX   AF,AF'
8038 6F       490        LD   L,A
8039 C34500   500        JP   L0507
803C 7A       510 L04FE  LD   A,D
803D B3       520        OR   E
803E 280C     530        JR   Z,L050E
8040 DD6E00   540        LD   L,(IX+0)
8043 7C       550 L0505  LD   A,H
8044 AD       560        XOR  L
8045 67       570 L0507  LD   H,A
8046 3E01     580        LD   A,#01
8048 37       590        SCF
8049 C36300   600        JP   L0525
804C 6C       610 L050E  LD   L,H
804D 18F4     620        JR   L0505
804F 79       630 L0511  LD   A,C
8050 CB78     640        BIT  7,B
8052 10FE     650 L0514  DJNZ L0514
8054 3004     660        JR   NC,L051C
8056 0616     670        LD   B,#16
8058 10FE     680 L051A  DJNZ L051A
805A D3FE     690 L051C  OUT  (#FE),A
805C 0615     700        LD   B,#15
805E 20EF     710        JR   NZ,L0511
8060 05       720        DEC  B
8061 AF       730        XOR  A
8062 3C       740        INC  A
8063 CB15     750 L0525  RL   L
8065 C25200   760        JP   NZ,L0514
8068 1B       770        DEC  DE
8069 DD23     780        INC  IX
806B 0610     790        LD   B,#10
806D 3E7F     800        LD   A,#7F
806F DBFE     810        IN   A,(#FE)
8071 1F       820        RRA
8072 D0       830        RET  NC
8073 7A       840        LD   A,D
8074 3C       850        INC  A
8075 C23C00   860        JP   NZ,L04FE
8078 063B     870        LD   B,#3B
807A 10FE     880 L053C  DJNZ L053C
807C C9       890        RET
              900 *
              910 *
              920 * 4500 BAUD LD_BYTES ROUTINE
              930 *
              940 * (IX) = START ADDRESS
              950 * (DE) = LENGTH
              960 *  (A) =   0 = HEADER
              970 *  (A) = 255 = DATA
              980 * CARRY RESET= VERIFY
              990 * CARRY SET  = LOAD
             1000 *
             1010 *
807D 14      1020 L0556  INC  D
807E 08      1030        EX   AF,AF'
807F 15      1040        DEC  D
8080 F3      1050        DI
8081 3E0F    1060        LD   A,#0F
8083 D3FE    1070        OUT  (#FE),A
8085 213F05  1080        LD   HL,#053F
8088 E5      1090        PUSH HL
8089 DBFE    1100        IN   A,(#FE)
808B 1F      1110        RRA
808C E620    1120        AND  #20
808E F602    1130        OR   #02
8090 4F      1140        LD   C,A
8091 BF      1150        CP   A
8092 C0      1160 L056B  RET  NZ
8093 CD0E01  1170 L056C  CALL L05E7
8096 30FA    1180        JR   NC,L056B
8098 211504  1190        LD   HL,#0415
809B 10FE    1200 L0574  DJNZ L0574
809D 2B      1210        DEC  HL
809E 7C      1220        LD   A,H
809F B5      1230        OR   L
80A0 20F9    1240        JR   NZ,L0574
80A2 CD0A01  1250        CALL L05E3
80A5 30E3    1260        JR   NC,L056B
80A7 069C    1270 L0580  LD   B,#9C
80A9 CD0A01  1280        CALL L05E3
80AC 30E4    1290        JR   NC,L056B
80AE 3EC6    1300        LD   A,#C6
80B0 B8      1310        CP   B
80B1 30E0    1320        JR   NC,L056C
80B3 24      1330        INC  H
80B4 20F1    1340        JR   NZ,L0580
80B6 06C9    1350 L058F  LD   B,#C9
80B8 CD0E01  1360        CALL L05E7
80BB 30D5    1370        JR   NC,L056B
80BD 78      1380        LD   A,B
80BE FED4    1390        CP   #D4
80C0 30F4    1400        JR   NC,L058F
80C2 CD0E01  1410        CALL L05E7
80C5 D0      1420        RET  NC
80C6 79      1430        LD   A,C
80C7 EE03    1440        XOR  #03
80C9 4F      1450        LD   C,A
80CA 2600    1460        LD   H,#00
80CC 063B    1470        LD   B,#3B
80CE 181F    1480        JR   L05C8
80D0 08      1490 L05A9  EX   AF,AF'
80D1 2007    1500        JR   NZ,L05B3
80D3 300F    1510        JR   NC,L05BD
80D5 DD7500  1520        LD   (IX+0),L
80D8 180F    1530        JR   L05C2
80DA CB11    1540 L05B3  RL   C
80DC AD      1550        XOR  L
80DD C0      1560        RET  NZ
80DE 79      1570        LD   A,C
80DF 1F      1580        RRA
80E0 4F      1590        LD   C,A
80E1 13      1600        INC  DE
80E2 1807    1610        JR   L05C4
80E4 DD7E00  1620 L05BD  LD   A,(IX+0)
80E7 AD      1630        XOR  L
80E8 C0      1640        RET  NZ
80E9 DD23    1650 L05C2  INC  IX
80EB 1B      1660 L05C4  DEC  DE
80EC 08      1670        EX   AF,AF'
80ED 063B    1680        LD   B,#3B
80EF 2E01    1690 L05C8  LD   L,#01
80F1 CD0A01  1700 L05CA  CALL L05E3
80F4 D0      1710        RET  NC
80F5 3E44    1720        LD   A,#44
80F7 B8      1730        CP   B
80F8 CB15    1740        RL   L
80FA 063B    1750        LD   B,#3B
80FC D2F100  1760        JP   NC,L05CA
80FF 7C      1770        LD   A,H
8100 AD      1780        XOR  L
8101 67      1790        LD   H,A
8102 7A      1800        LD   A,D
8103 B3      1810        OR   E
8104 20CA    1820        JR   NZ,L05A9
8106 7C      1830        LD   A,H
8107 FE01    1840        CP   #01
8109 C9      1850        RET
810A CD0E01  1860 L05E3  CALL L05E7
810D D0      1870        RET  NC
810E 3E07    1880 L05E7  LD   A,#07
8110 3D      1890 L05E9  DEC  A
8111 20FD    1900        JR   NZ,L05E9
8113 C3EC05  1910        JP   #05EC
Pass 2 errors  00
L04C2  8000   L04D0  800E   L04D8  8016   L04EA  8028   L04F2  8030
L04FE  803C   L0505  8043   L0507  8045   L050E  804C   L0511  804F
L0514  8052   L051A  8058   L051C  805A   L0525  8063   L053C  807A
L0556  807D   L056B  8092   L056C  8093   L0574  809B   L0580  80A7
L058F  80B6   L05A9  80D0   L05B3  80DA   L05BD  80E4   L05C2  80E9
L05C4  80EB   L05C8  80EF   L05CA  80F1   L05E3  810A   L05E7  810E
L05E9  8110
Table used    385  from   500
```

Printing by numbers

***Rogar Walton** presents a machine coda graphics printer dump for an Epson printer*

Anyone who uses a microcomputer for any "serious" purpose soon realises the benefits of having a printer. Hard-copy makes the development of programs much easier. People preparing for examinations in computing often have to provide printed examples of their work. The Dragon 32 provides the *Print #–2* and *Llist* instructions for transfer of text to a printer but these cannot be used for printing graphics. The following program provides a graphics dump which will print *PMode 4* graphics on an Epson printer.

Listing 1 gives a Basic program for the dump routine. When loaded and run this program stores a machine code subroutine at the top of user Ram. This routine may be called when necessary using *Exec &H7F30*. The graphics will be dumped to the printer in a matter of secohds. A similar program written entirely in Basic takes about 20 minutes.

Listing 2 gives the assembly language version of the program. This together with the following tips, snduld make it clear how the program works and enable readers to adapt it to their own requirements.

The *Pmode 4* screen is arranged in 24 lines of 32 bytes per line. Thus the top left-hand pixel is turned on by setting the msb (most significant bit) of the relevant byte which is *&H600*. The Epson printer uses 8 wires which are addressed vertically, the top wire corresponding to the msb. This means that each byte sent to the printer gives information about 8 pixels vertically above one another. The screen is read and printed in sections 8 lines deep, 1 bit at a time. When a full line has been read, the process repeats from the left-hand edge of the screen. In all, 24 sections must be read and printed.

Sample printouts are included to illustrate the program in use.

Listing 1

```
10 '********LISTING 1**********
20 ' Graphics dump for DRAGON
30 ' to Epson printer
40 ' dumps MODE 4 graphics
50 ' Tested using MX-80F/T
60 '
70 ' Roger Walton, Feb. 1984
80 '
90 CLEAR 200,&H7F2F
100 FOR I=&H7F30 TO &H7FFF
110 READ A$
120 A$="&H"+A$
130 N=VAL(A$)
140 POKE I,N
150 T=T+N
160 NEXT
170 IF T<>20778 THEN CLS:PRINT"DATA ERROR":STOP
180 END
190 DATA 20,D8,12,12,12,12,12,12
200 DATA 12,12,86,1B,B0,80,0F,86
210 DATA 40,BD,B0,0F,86,1B,BD,80
220 DATA 0F,86,41,BD,80,0F,86,D8
230 DATA BD,80,0F,86,0D,BD,80,0F
240 DATA 7F,7F,36,7F,7F,35,7F,7F
250 DATA 37,8E,06,00,BF,7F,38,7F
260 DATA 7F,32,86,1B,BD,80,0F,86
270 DATA 4B,BD,80,0F,86,00,BD,80
280 DATA 0F,86,01,BD,80,0F,C6,80
290 DATA F7,7F,33,86,80,B7,7F,36
300 DATA BE,7F,38,7F,7F,34,A6,84
310 DATA 84,7F,33,BD,4D,30,88,20
320 DATA 7C,7F,34,F6,7F,34,C1,D8
330 DATA 25,EC,B6,7F,37,BD,80,0F
340 DATA 7F,7F,37,F6,7F,33,54,F7
350 DATA 7F,33,C1,00,26,CD,BE,7F
360 DATA 38,30,01,BF,7F,38,7C,7F
370 DATA 32,B6,7F,32,81,20,26,86
380 DATA 86,0A,BD,80,0F,BE,7F,38
390 DATA 30,89,00,E0,BF,7F,38,7C
400 DATA 7F,35,B6,7F,35,81,18,26
410 DATA 86,39,34,06,81,00,27,0E
420 DATA B6,7F,36,F6,7F,36,FB,7F
430 DATA 37,F7,7F,37,20,03,86,7F
440 DATA 36,44,B7,7F,36,35,D8,39
```

Listing 2

```
        ORG $7F30
********* LISTING 2 *********
*****************************
*   Dragon Microcomputer    *
*   Graphics Dump           *
*                           *
*   Designed for Epson      *
*   MX-80F/T Printer        *
*                           *
*   Roger Walton Feb. 1984  *
*****************************
        BRA @START
@PRINTER EQU $800F Dragon BRD printer routine
@BYTEREAD RMB 1
@BITTOTEST RMB 1
@LINECOUNT RMB 1
@LOCSREAD RMB 1
@PRINBIT RMB 1
@PRINSTORE RMB 1
@SCREENPOS RMB 2
*****************************
* Reset printer and set linespace
* to 8 dots per line
@START LDA #27
        JSR @PRINTER
        LDA #'@
        JSR @PRINTER
        LDA #27
        JSR @PRINTER
        LDA #'A
        JSR @PRINTER
        LDA #8
        JSR @PRINTER
        LDA #27
        JSR @PRINTER
*****************************
        CLR @PRINBIT
        CLR @LOCSREAD
        CLR @PRINSTORE
        LDX #$600
        STX @SCREENPOS
*****************************
@LOCLOOP CLR @BYTEREAD
* Set bit image graphics, 256 dots/line
        LDA #27
        JSR @PRINTER
        LDA #'K
        JSR @PRINTER
        LDA #0
        JSR @PRINTER
        LDA #1
        JSR @PRINTER
*****************************
@LINELOOP LDB #128 set msb
        STB @BITTOTEST
*****************************
@BYTELOOP LDB #128 set msb
        STB @PRINBIT
        LDX @SCREENPOS
        CLR @LINECOUNT
*****************************
@BITLOOP LDA ,X point to first byte
        ANDA @BITTOTEST test bit
        BSR @INCPRINT
@CONT LEAX 32,X point to next line
        INC @LINECOUNT
        LDA @LINECOUNT
        CMPA #8 have 8 lines been done
        BNE @BITLOOP
*****************************
        LDA @PRINSTORE print byte
        JSR @PRINTER
        CLR @PRINSTORE then set to zero
        LDB @BITTOTEST
        LSRB
        STB @BITTOTEST check if a full
        CMPB #0 screen byte has been read
        BNE @BYTELOOP
*****************************
        LDX @SCREENPOS point to next byte
        LEAX 1,X       across the screen
        STX @SCREENPOS
        INC @BYTEREAD
        LDA @BYTEREAD
        CMPA #32 check if full line printed
        BNE @LINELOOP
*****************************
        LDA #10 linefeed printer
        JSR @PRINTER
        LDX @SCREENPOS point to next8 line
        LEAX 224,X     section on the screen
        STX @SCREENPOS
        INC @LOCSREAD
        LDA @LOCSREAD
        CMPA #24
        BNE @LOCLOOP
*****************************
        RTS
*****************************
@INCPRINT PSHS B
        CMPA #0
        BEQ @NOTSET
        LDA @PRINBIT
        LDB @PRINBIT    set up appropriate
        ADDA @PRINSTORE bit to print out
        STA @PRINSTORE
        BRA @SET
@NOTSET LDA @PRINBIT
@SET    LSRA
        STA @PRINBIT
        PULS B
        RTS
*****************************
        END
```


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Between the lines

***Adrian Warman** looks inside the SID chip and explains how to Peek some of the registers*

The Commodore 64 home computer has a device called SID (Sound Interface Device), which is used for providing sound effects, as well as obtaining paddle information. There are 29 registers within SID, of which the first 25 are of greatest interest to programmers. These registers are divided into four groups

a) Registers controlling Voice 1
b) Registers controlling Voice 2
c) Registers controlling Voice 3
d) Registers controlling Resonance Filtering and the Master Volume

Unfortunately, all these registers are designated as 'write-only' (the exact opposite of 'read-only'). This means that whenever you *Poke* data to one of these registers, it is accepted without difficulty — but if you attempt to *Peek* any of the registers, you will always get the value 'O' returned regardless of the actual contents of that register. Thus, reading the registers has no effect

There are a variety of ways of overcoming this problem. Using Basic for example it would be possible to keep a 'master copy' of all the registers in an array (say, SID) — then, whenever information is transferred to a SID register, the corresponding element in the array is also updated. Unfortunately, this takes time, particularly when using the large numbers of *Pokes* required to program SID

Adept machine-code programmers could write a routine to transfer data to a specified register, and at the same time update a copy of that register. Less experienced programmers, however, would find this more difficult. This program provides a simple and fast routine to do the job, and combines the capability and speed of machine code with the inherent simplicity of normal SID use. Normally when programming SID from Basic, *Pokes* are used to locations 54272 to 54296

This program provides an alternative area of Ram from $C047 to $C05F, which behaves as an exact copy of SID. *Pokes* made into this area will have precisely the same effect as corresponding *Pokes* into the genuine SID area. The advantage is that being Ram, *Peeking* these locations will return the current contents of the appropriate SID register

The program works by altering the *Irq* activities. The routine simply copies the contents of the SID copy area into the SID itself. This updating occurs once every 60th of a second, and is completely transparent to the user

To use the program, simply load and run the supplied Basic loader program. The program is then installed in the Ram from $C000 onwards. To activate the copy routine, use the instruction

SYS 49152

Although no apparent effect will be observed (ie the computer simply returns with the Ready message), the *irq* vector has now been modified. Any subsequent *Pokes* to the SID copy area will perform exactly as if the *Poke* had been made to the SID itself. Note that at any time you can use the same command to entirely reset all registers within the SID chip, since this routine automatically clears all the copy locations to zero

Hex	*Decimal*	*Function*	*Normal SID location*
C047	49223	Freq Lo Voice 1	54272
C048	49224	Freq HI	54272
C049	49225	Pulse Lo	54274
C04A	49226	Pulse Hi	54275
C04B	49227	Contrl	54276
C04C	49228	Attack/Decay	54277
C04D	49229	Sustain/Release	54278
C04E	49230	As voice 1 but for voice 2	54279
C054	49236		54285
C055	49238	As voice 1 but for voice 3	54286
C05B	49243		54292
C05C	49244	Filter Cutoff Lo	54293
C05D	49245	Filter Cutoff HI	54294
C05E	49246	Resonance	54295
C05F	49247	Modes/Master Volume	54296

To disable the copying process simply perform a warm start (ie, *Run/Stop Restore*). You will find the table below useful

Notes

(Please refer to the Assembly listing while reading these details)

1210–1260 This section will alter the *Irq* vector. However, a check is made to see if the vector already points to the copy routine. If so, no modification is necessary

1350–1440 The *Irq* vector was found not to point to the copy routine, so this section of code alters the vector appropriately. Note that the old *Irq* vector is preserved, and when the copying process has been completed the CPU jumps using the old *Irq* vector that was found

1540–1590 Having modified the *Irq* vector (or not!) these lines ensure that the SID copy area is blank, and has no garbage bytes in it. Note that whenever this routine is run, the SID chip will be reset because all the zeroes will be copied across upon the next interrupt.

1700–1830 The copy routine itself. First of all, the A,P and Y registers are preserved, since they will be modified during the copying. This precaution is very important since interrupt information is probably contained within the registers. After preserving the registers, the SID copy area is duplicated into the SID chip itself (lines 1740–1780). The registers are then restored back to their original values, ready to enter the normal *Irq* routine

Note that in the Assembly listing, it appears that the chip will perform an *Irq* jump to location $0000 (line 1830). In fact, this address will be altered when the *Irq* vector is changed (lines 1370 and 1410)

```
1000 REM BASIC LOADER FOR SID-COPY PROGRAM.
1010 :
1020 REM BY A.WARMAN
1030 :
1040 ADDRESS=49152
1050 SUM=0
1060 :
1070 FOR LOC=ADDRESS TO ADDRESS+95
1080  READ DATUM
1090  POKE LOC,DATUM
1100  SUM=SUM+DATUM
1110 NEXT LOC
1120 :
1130 IF SUM<>7288 THEN PRINT "SUM ERROR."
1140 STOP
1150 :
1160 DATA 173, 20,  3,201, 49,208,  7,173
1170 DATA  21,  3,201,192,240, 24,120,173
1180 DATA  20,  3,141, 69,192,169, 49,141
1190 DATA  20,  3,173, 21,  3,141, 70,192
1200 DATA 169,192,141, 21,  3, 88,160, 24
1210 DATA 169,  0,153, 71,192,136, 16,250
1220 DATA  96, 72,  8,152, 72,160, 24,185
1230 DATA  71,192,153,  0,212,136, 16,247
1240 DATA 104,168, 40,104, 76,  0,  0,  0
1250 DATA   0,  0,  0,  0,  0,  0,  0,  0
1260 DATA   0,  0,  0,  0,  0,  0,  0,  0
1270 DATA   0,  0,  0,  0,  0,  0,  0,  0
```

```
1000 C000              *=$C000
1010 C000              ;
1020 C000              ; SID ASSIST PROGRAM.
1030 C000              ;
1040 C000              ; BY A.WARMAN
1050 C000              ;
1060 C000              ; PROVIDES AN AREA IN NORMAL RAM
1070 C000              ; WHICH IS COPIED DURING A SYSTEM
1080 C000              ; IRQ INTO THE SID REGISTERS. THIS
1090 C000              ; MEANS THAT THE CURRENT SID REGISTER
1100 C000              ; VALUES CAN BE READ FROM THE RAM.
1110 C000              ;
1120 C000              SID          = $D400
1130 C000              ;
1140 C000              ; MODIFY THE IRQ VECTOR TO PERFORM THE
1150 C000              ; ADDITIONAL TASK. A CHECK IS MADE TO
1160 C000              ; ESTABLISH WHETHER THE IRQ VECTOR IS
1170 C000              ; ALREADY POINTING TO THE COPY ROUTINE,
1180 C000              ; AND IF SO, THE VECTOR WILL NOT BE
1190 C000              ; ALTERED
1200 C000              ;
1210 C000 AD1403 REDIRECT     LDA $0314
1220 C003 C931                CMP #<UPDATE
1230 C005 D007                BNE MODIFY
1240 C007 AD1503              LDA $0315
1250 C00A C9C0                CMP #>UPDATE
1260 C00C F018                BEQ EXIT
1270 C00E              ;
1280 C00E              ; THE IRQ VECTOR IS NOT POINTING TO THE
1290 C00E              ; COPY ROUTINE, SO MODIFY.
1300 C00E              ; NOTE THAT THE OLD IRQ VECTOR IS COPIED
1310 C00E              ; TO THE END OF THE ROUTINE, SO THAT
1320 C00E              ; ANY PRIOR MODIFICATIONS TO IRQ VECTOR
1330 C00E              ; WILL NOT BE 'DAMAGED'.
1340 C00E              ;
1350 C00E 78     MODIFY       SEI
1360 C00F AD1403              LDA $0314
1370 C012 8D45C0              STA IRQEXIT+1
1380 C015 A931                LDA #<UPDATE
1390 C017 8D1403              STA $0314
1400 C01A AD1503              LDA $0315
1410 C01D 8D46C0              STA IRQEXIT+2
1420 C020 A9C0                LDA #>UPDATE
1430 C022 8D1503              STA $0315
1440 C025 58                  CLI
1450 C026              ;
1460 C026              ; HAVING COMPLETED ANY NECESSARY CHANGES
1470 C026              ; TO THE IRQ VECTOR, THE COPY OF THE
1480 C026              ; SID REGISTERS IS RESET TO ZERO.
1490 C026              ; THIS HAS THE ADDITIONAL ADVANTAGE THAT
1500 C026              ; AT ANY TIME, RERUNNING THE REDIRECT
1510 C026              ; PROGRAM WILL 'SWITCH OFF' ANY SOUND
1520 C026              ; CURRENTLY PRODUCED BY THE SID.
1530 C026              ;
1540 C026 A018   EXIT         LDY #$18
1550 C028 A900                LDA #$00
1560 C02A 9947C0 CLRCOPY      STA SIDCOPY,Y
1570 C02D 88                  DEY
1580 C02E 10FA                BPL CLRCOPY
1590 C030 60                  RTS
1600 C031              ;
1610 C031              ;
1620 C031              ; THE IRQ VECTOR POINTS TO THIS ROUTINE.
1630 C031              ; THE A,P AND Y REGISTERS ARE PRESERVED
1640 C031              ; ON THE STACK. THE INFORMATION IN THE
1650 C031              ; COPY OF SID IS COPIED ACROSS TO THE
1660 C031              ; SID LOCATIONS. THE A,P AND Y REGISTERS
1670 C031              ; ARE THEN RESTORED BEFORE JUMPING TO
1680 C031              ; THE NORMAL IRQ ROUTINE.
1690 C031              ;
1700 C031 48     UPDATE       PHA
1710 C032 08                  PHP
1720 C033 98                  TYA
1730 C034 48                  PHA
1740 C035 A018                LDY #$18
1750 C037 B947C0 COPYLOOP     LDA SIDCOPY,Y
1760 C03A 9900D4              STA SID,Y
1770 C03D 88                  DEY
```

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```
1780 C03E 10F7              BPL COPYLOOP
1790 C040 68                PLA
1800 C041 A8                TAY
1810 C042 28                PLP
1820 C043 68                PLA
1830 C044 4C0000 IRQEXIT    JMP $0000
1840 C047        '
1850 C047        '
1860 C047        ' AREA THAT CONTAINR VALUES TL DE COPIED
1870 C047        ' INTO SID.
1880 C047        '
1890 C047 0000   SIDCOPY    WOR $0000                ' FREQ V1
1900 C049 0000              WOR $0000                ' PW V1
1910 C04B 00                BYT $00                  ' CONTROL V1
1920 C04C 00                BYT $00                  ' A/D V1
1930 C04D 00                BYT $00                  ' S/R V1
1940 C04E        '
1950 C04E 0000              WOR $0000                ' FREQ V2
1960 C050 0000              WOR $0000                ' PW V2
1970 C052 00                BYT $00                  ' CONTROL V2
1980 C053 00                BYT $00                  ' A/D V2
1990 C054 00                BYT $00                  ' S/R V2
2000 C055        '
2010 C055 0000              WOR $0000                ' FREQ V3
2020 C057 0000              WOR $0000                ' PW V3
2030 C059 00                BYT $00                  ' CONTROL V3
2040 C05A 00                BYT $00                  ' A/D V3
2050 C05B 00                BYT $00                  ' S/R V3
2060 C05C        '
2070 C05C 0000              WOR $0000                ' FILTER
2080 C05E 00                BYT $00                  ' RES/FILT
2090 C05F 00                BYT $00                  ' MODE/VOL

C02A CLRCOPY       C037 COPYLOOP      C026 EXIT       C044 IRQEXIT
C00E MODIFY        C000 REDIRECT      D400 SID        C047 SIDCOPY
C031 UPDATE
```

Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the _Program of the Week_ double our new fee of £6 for each program published.

Designer

on Spectrum

This program is for any Sinclair ZX Spectrum and enables the user to make complicated screen displays. The keys which are used are explained in the program. Be careful when using draw. If the draw statement is out of range you will lose your picture unless you either *goto* the next line number or press *continue*. The program also enables you to define your own grpahics by pressing C. You are then asked which graphic is to be defined; you respond and put in the grpahic numbers one row at a time. You are also able to *Save* the present screen string which you are working on. You can *Load* it back and you are also able to *Load* pre-defined graphics which you have *Saved* from the *Horizons* Character Generator.

The program is written entirely in Basic and parts of the program could, if you wanted to, be converted in to machine code. Although in Basic it is very fast at processing your command.

Program notes

10	Subroutine for introduction
20-100	Subroutine for user to communicate through computer
110-235	Subroutine to place text on screen
300-540	Subroutine to chose defined graphic.
550-750	Subroutine to print graphic on screen and to colour it.
780-850	Subroutine to *Draw* and to *plot* on screen
900-980	Subroutine to define characters.
9000-9490	Subroutine for introduction

When you have typed in the program Save it by using the self start facility. When it is run you will be greeted with the introduction and instructions.

```
   5 PAPER 7: INK 0: CLS
  10 GO SUB 9000
  20 LET x=1: LET y=1
  30 IF INKEY$="i" OR INKEY$="I"
 THEN BEEP .1,01: INPUT "What i
nk?(0-7)";ink: INK ink
  40 IF INKEY$="s" OR INKEY$="S"
 THEN BEEP .1,01: SAVE "PICTURE"
CODE 16384,6912
  50 IF INKEY$="p" OR INKEY$="P"
 THEN BEEP .1,01: GO SUB 110: GO
 SUB 170: GO SUB 240
  60 IF INKEY$="g" OR INKEY$="G"
 THEN BEEP .1,01: GO SUB 300
  70 IF INKEY$="w" OR INKEY$="W"
 THEN BEEP .1,0.2: CLS
  80 IF INKEY$="L" OR INKEY$="l"
 THEN BEEP .1,01: LOAD ""CODE
  90 IF INKEY$="D" OR INKEY$="d"
 THEN BEEP .1,01: GO SUB 760
  95 IF INKEY$="c" OR INKEY$="C"
 THEN BEEP .1,01: GO SUB 900
 100 GO TO 30
 110 LET flash=0: LET bright=0
 120 INPUT "Change ink colour?(Y
N)",a$
 130 IF a$="y" OR a$="Y" THEN IN
PUT "What ink?(0-7)",ink: INK in
k
 140 IF a$<>"y" OR a$<>"Y" THEN
GO TO 150
 150 INPUT "Y-cordinate?(0-20)",
y: IF y>20 OR y<0 THEN GO TO 150
 160 INPUT "X-cordinate?(0-30)",
x: IF x>30 OR x<0 THEN GO TO 160
 165 RETURN
 170 INPUT "What?",a$
 180 INPUT "Do you want it to fl
ash",b$
 190 IF b$="y" OR b$="Y" THEN LE
T flash=1
 200 IF b$="n" OR b$="N" THEN LE
T flash=0
 210 INPUT "Do you want it brigh
t",c$
 220 IF c$="y" OR c$="Y" THEN LE
T bright=1
 230 IF c$="n" OR c$="N" THEN LE
T bright=0
 235 RETURN
 240 PRINT FLASH flash; BRIGHT b
right;AT y,x;a$
 250 RETURN
 300 PRINT #0;"ABCDEFGHIJKLMNOPQ
RSTU"
 310 PAUSE 0: INPUT #1;"Which?(1
-21)",g
 320 IF g=1 THEN GO SUB 120: GO
SUB 180: GO SUB 550
 330 IF g=2 THEN GO SUB 120: GO
SUB 180: GO SUB 560
 340 IF g=3 THEN GO SUB 120: GO
SUB 180: GO SUB 570
 350 IF g=4 THEN GO SUB 120: GO
SUB 180: GO SUB 580
 360 IF g=5 THEN GO SUB 120: GO
SUB 180: GO SUB 590
 370 IF g=6 THEN GO SUB 120: GO
SUB 180: GO SUB 600
 380 IF g=7 THEN GO SUB 120: GO
SUB 180: GO SUB 610
 390 IF g=8 THEN GO SUB 120: GO
SUB 180: GO SUB 620
 400 IF g=9 THEN GO SUB 120: GO
SUB 180: GO SUB 630
 410 IF g=10 THEN GO SUB 120: GO
SUB 180: GO SUB 640
 420 IF g=11 THEN GO SUB 120: GO
SUB 180: GO SUB 650
 430 IF g=12 THEN GO SUB 120: GO
SUB 180: GO SUB 660
 440 IF g=13 THEN GO SUB 120: GO
SUB 180: GO SUB 670
 450 IF g=14 THEN GO SUB 120: GO
SUB 180: GO SUB 680
 460 IF g=15 THEN GO SUB 120: GO
SUB 180: GO SUB 690
 470 IF g=16 THEN GO SUB 120: GO
SUB 180: GO SUB 700
 480 IF g=17 THEN GO SUB 120: GO
SUB 180: GO SUB 710
 490 IF g=18 THEN GO SUB 120: GO
SUB 180: GO SUB 720
 500 IF g=19 THEN GO SUB 120: GO
SUB 180: GO SUB 730
 510 IF g=20 THEN GO SUB 120: GO
SUB 180: GO SUB 740
 520 IF g=21 THEN GO SUB 120: GO
SUB 180: GO SUB 750
 530 IF g>21 OR g<1 THEN GO TO 3
00
 540 RETURN
 550 PRINT FLASH flash; BRIGHT b
right;AT y,x;"A": RETURN
 560 PRINT FLASH flash; BRIGHT b
right;AT y,x;"B": RETURN
 570 PRINT FLASH flash; BRIGHT b
right;AT y,x;"C": RETURN
 580 PRINT FLASH flash; BRIGHT b
right;AT y,x;"D": RETURN
 590 PRINT FLASH flash; BRIGHT b
right;AT y,x;"E": RETURN
 600 PRINT FLASH flash; BRIGHT b
right;AT y,x;"F": RETURN
 610 PRINT FLASH flash; BRIGHT b
right;AT y,x;"G": RETURN
 620 PRINT FLASH flash; BRIGHT b
right;AT y,x;"H": RETURN
 630 PRINT FLASH flash; BRIGHT b
right;AT y,x;"I": RETURN
 640 PRINT FLASH flash; BRIGHT b
right;AT y,x;"J": RETURN
 650 PRINT FLASH flash; BRIGHT b
right;AT y,x;"K": RETURN
 660 PRINT FLASH flash; BRIGHT b
right;AT y,x;"L": RETURN
 670 PRINT FLASH flash; BRIGHT b
right;AT y,x;"M": RETURN
 680 PRINT FLASH flash; BRIGHT b
right;AT y,x;"N": RETURN
 690 PRINT FLASH flash; BRIGHT b
right;AT y,x;"O": RETURN
 700 PRINT FLASH flash; BRIGHT b
right;AT y,x;"P": RETURN
 710 PRINT FLASH flash; BRIGHT b
right;AT y,x;"Q": RETURN
 720 PRINT FLASH flash; BRIGHT b
right;AT y,x;"R": RETURN
```

```
730 PRINT FLASH flash, BRIGHT b
right,AT y,x,"S" RETURN
740 PRINT FLASH flash, BRIGHT b
right,AT y,x,"T" RETURN
750 PRINT FLASH flash, BRIGHT b
right,AT y,x,"U" RETURN
760 LET a=0 LET v=0
770 INPUT "X-Cordinate?(0-255)"
,a
780 INPUT "Y-Cordinate?(0-175)"
,b
790 IF a<0 OR a>255 THEN GO TO
770
800 IF b<0 OR b>175 THEN GO TO
770
810 INPUT "How long?(0-no/F+no)
,e
820 INPUT "How long?(U+no/D-no)
,f
830 PLOT a,b
840 DRAW e,f
850 RETURN
900 PRINT #1,"Define characters

910 PAUSE 0
920 INPUT "What graphic?(A-U)",
q$
930 FOR j=0 TO 7
940 INPUT "What no?(0-255)",ch
950 POKE USR q$+j ch
970 NEXT j
980 RETURN
9000 LET ink=0
9010 PRINT AT 0,8,"PICTURE-MAKER

9020 PRINT AT 1,8,"-------------

9030 PRINT   PRINT "S=Saves pres
ent screens."
9040 PRINT   PRINT "I=Changes pr
esent ink colour."
9050 PRINT   PRINT "G=Enables us
er defined graphics"
9060 PRINT   PRINT "  to be used
."
9070 PRINT   PRINT "L=Loads a sc
reens or graphics."
9080 PRINT   PRINT "D=Enables yo
u to draw by you"
9090 PRINT   PRINT "  inputting
x and y cordinates."
9100 PRINT   PRINT "C=Charecter
definer."
9110 PRINT   PRINT "V=Clear scre
en."
9120 PRINT   PRINT "P=Places tex
t."
9130 PRINT #1,"    PRESS ANY KEY
TO CONTINUE
9140 PAUSE 0  CLS
9150 PRINT AT 0,8 "PICTURE-MAKER

9160 PRINT AT 1,8,"-------------
"
9170 PRINT   PRINT "You can make
 your own defined"
9180 PRINT   PRINT "charecters b
y you making them
9190 PRINT   PRINT "out first an
d then putting in "
9200 PRINT   PRINT "them in,when
 you are told."
9210 PRINT AT 11,11, INK 2, FLAS
H 1,"WARNING" FLASH 0
9220 PRINT   PRINT "If you put i
n a draw statement"
9230 PRINT   PRINT "which is out
 of range,you will "
9240 PRINT   PRINT "have to pres
s key C so you will"
9245 PRINT   PRINT "not lose you
r screens."
9250 PRINT   PRINT "         PRES
S ANY KEY"  PAUSE 0  CLS
9255 INK 0
9260 PRINT AT 0,1,"PICTURE-MAKER
--Hints for use"
9270 PRINT AT 1,1,"-------------
----------------"
9280 PRINT   PRINT "Use Graphic/
Text planning sheet
9290 PRINT   PRINT "to set out p
icture."
9300 PRINT   PRINT "Work out eve
rything first to "
9310 PRINT   PRINT "make sure th
ere are no errors."
9320 PRINT   PRINT "as it is ver
y difficult to
9330 PRINT   PRINT "correct with
out losing screens."
9335 PRINT   PRINT "Make sure CA
PS lock is on."
9340 PRINT   PRINT   PRINT   PRI
NT   PRINT   PRINT "         PRES
S ANY KEY"
9350 PAUSE 0  CLS
9360 POKE 23609 50
9400 INPUT "What paper colour?(0
-7)",p
9410 INPUT "What ink?(0-7)",ink
9420 IF p<0 OR p>7 THEN GO TO 93
60
9430 IF ink<0 OR ink>7 THEN GO T
O 9360
9440 PAPER p  INK ink  CLS
9450 RETURN
```

Designer
by D Nation

Joystick Draw

on Dragon

This program shows how the joystick commands on the Tandy/Dragon can be used to draw intricate designs. The program uses the right hand joystick, and works as follows. If the joystick is moved upwards the X co-ordinate is decremented. If the joystick is moved downwards the X co-ordinate is incremented.

This is superior to the programs previously submitted for this purpose. These previous programs plotted the reading of the joystick ports multiplied by 2.

This can be used with the screen dump program and screens can be saved by pressing 'S'. The screen can be cleared by pressing 'C'.

```
10 REM **JOYSTICK DRAW 26/12/83**
20 REM **BY D.BRYAN ***********
30 PMODE4:SCREEN1,1:PCLS
40 X=JOYSTK(0):Y=JOYSTK(1)
50 IF X<=20 AND XC>0 THEN XC=XC-1
60 IF X>=40 AND XC<256 THEN XC=XC+1
70 IF Y<=20 AND YC>0 THEN YC=YC-1
80 IF Y>=40 AND YC<192 THEN YC=YC+1
90 PSET(XC,YC,5)
100 A$=INKEY$
110 IF A$="S"THEN 140
120 IF A$="C"THEN PCLS
130 GOTO40
140 CLS
150 SCREEN0,1:INPUT"IS CASSETTE READY";Q
$:IF LEFT$(Q$,1)="Y" THEN 170ELSE 150
160 SCREEN0,1
170 PRINT"SAVING SCREEN"
180 CSAVEM"SCREEN",1536,7679,1536
190 CLS:INPUT"ANOTHER SCREEN";A$:IF LEFT
$(A$,1)="Y" THEN RUN ELSE 130
```

Joystick Draw
by D Bryan

Little Meanies

on BBC

The main idea of this game is to stop the invaders reaching the bottom of the screen. If they get there a small part of your defence is knocked away until eventually they reach a flashing white line and you'll die. Each time you fire you lose 1 bullet. About every 12 seconds a yellow ship comes down and gives you more bullets. If you shoot the ship then you lose bullets.

Program notes

70-110	Jump to other Procedures
130-150	Defines Characters and sets up the Game screen.
450-720	Main program prints invaders.
930-990	Moves invaders
1150-1380	Prints out screen

Variables

Score	Your Score
Bul	Bullets left
Eee	Energy ship
X Y	Meanie 1
X1 Y1	Meanie 2
X2, Y2	Meanie 3

```
0 REM ***** 15/3/84 *******
1 REM *********************
2 REM *       LITTLE       *
3 REM *      MEANIES       *
4 REM *                    *
5 REM *         by         *
6 REM *                    *
7 REM *    ALAN WINSTON    *
8 REM *********************
10 MODE7
20 *FX11 0
30 ON ERROR GOSUB1030
40 SCORE=0 BUL=15 EEE=0
50 VDU23 1 0 0 0 0,
70 PROCTABEL(2)
90 MODE2
100 PROCSETUP
110 PROCPLAY
130 DEFPROCSETUP
140 VDU23 242 255,255,255,255,255,255,255,255
150 VDU23,243,0,0 128 224,252,128,0 0
160 VDU23 240,255,219 219 255 255 . . .
170 VDU23 24  0   1   63,1,0 0
180 VDU23 245 ...  126 128 60 60,60
190 W 0
200 REPEAT
210 FORQ=0TO3
220 COLOUR2
230 PRINTTAB(Q,W);CHR$242
240 PRINTTAB(Q+16,W),CHR$242
250 NEXT
260 W=W+1 UNTILW=26
270 REPEAT
280 COLOUR2 IFW=27THENCOLOUR15
290 FORQ=0TO19
300 PRINTTAB(Q,W),CHR$242
310 NEXT
320  W=W+1 UNTILW=30
330 W=0
340 PRINTTAB(0,0)
350 ENDPROC
360 DEFPROCGUN
370 VDU4
380 VDU23,1,0 0 0 0 0 0,0 0
390 COLOUR2 PRINTTAB(4 6);CHR$243,TAB(15 0),CHR$244
400 COLOUR12 PRINTTAB(0 1),"SCORE=";SCORE TAB(10,1),
    "BULLETS=".BUL  IFBUL<10 THEN PRINT"
410 COLOUR2
420 IFEEE=0 THEN A=RND(1000) IFTIME>A+2000THEN PROCENER
430 VDU5
440 ENDPROC
450 DEFPROCPLAY
460 X=RND(600)+300 Y=1000
470 GCOL0,2
480 X1=RND(600)+300 Y1=1200
490 X2=RND(600)+300 Y2=1400
500 C=0
510 VDU5
520 REPEAT
530 GCOL0,1
540 MOVEX,Y PRINTCHR$240
550 GCOL0,4
560 MOVEX1,Y1 PRINTCHR$240
570 GCOL0,5
580 MOVEX2,Y2 PRINTCHR$240
590 IFY 180 ORY1 180 OR Y2<180 THENPROCTABEL(0)
600 A$=INKEY$(1)
610 IFA$="Q"ANDTIME>T+100  ORA$="Z"ANDTIME>T+100
    THEN SOUND1 -10,100,3 BUL=BUL -1 PROCFIRE
615 FORDEL=0TO100 NEXT
620 MOVEX Y GCOL0,0 PRINTCHR$240
630 MOVEX1,Y1 PRINTCHR$240
640 MOVEX2 Y2 PRINTCHR$240
650 GCOL0 2
660 PROCMOVE
670 IFPOINT(X-10,Y)<>0 ORPOINT(X+54,Y)<>0
    THENPROCENDINV(0)
680 IFPOINT(X1-10 Y1)<>0 ORPOINT(X1+54,Y1)<>0
    THENPROCENDINV(1)
690 PROCGUN
700 IFPOINT(X2-10,Y2)<>0 ORPOINT(X2+54,Y2)<>0
    THENPROCENDINV(2)
710 UNTILL=1
720 GOTO460
730 DEFPROCFIRE
740 IFBUL<0 THEN PROCTABEL(0)
750 T=TIME
760 A=0
770 IFA$="Q"THEN P=300 O=815 I=970 ELSE
    P=300 O=425 I=970
780 GCOL0,7
790 MOVEP,O DRAWI,O
800 FORQ=310TO970 STEP30
810 IFPOINT(Q O+3)=1THEN A=1 ELSE IFPOINT
    (Q,O+3)=4THEN A=2 ELSE IFPOINT(Q,O+3)
    =5THENA=3 ELSE IF POINT(Q,O+3)=3 THEN A=10
820 NEXT
830 GCOL0,0 MOVEP,O DRAWI,O
840 PROCFFFIRE(A)
850 GCOL0,2
860 A=0
870 IFBUL<0 THEN PROCTABEL(0)
880 ENDPROC
890 DEFPROCENDINV(QQ)
900 GCOL0 0
910 IFQQ=0 THEN MOVEX Y PRINT" " X=RND(600)+300
    Y=1000 ELSE IFQQ=1 THEN MOVEX1,Y1 PRINT"
    " X1=RND(600)+300 Y1=1400 ELSE MOVEX2,Y2
    PRINT" " X2=RND(600)+300 Y2=1000
920 ENDPROC
930 DEFPROCMOVE
940 A=RND(50)-25 X=X+A
950 A=RND(50)-25 X1=X1+A
960 A=RND(50)-25 X2=X2+A
970 A=RND(25)-50 Y=Y+A
980 A=RND(25)     Y1=Y1+A
990 A=RND(25)-30 Y2=Y2+A
1000 SOUND2,-6,230,5 SOUND3,-6,170,5
1010 IFEEE=1 THEN PROCME
1020 ENDPROC
1030 MODE7 IFERR=17 THENRETURN ELSE REPORT
     PRINT" in line ",ERL
1040 END
1050 DEF PROCFFFIRE(A)
```

Open Forum

```
1060 IFA=0 THEN ENDPROC
1070 MOVEX,Y GCOL0,0 PRINTCHR$240
1080 MOVEX1,Y1 PRINTCHR$240
1090 MOVEX2,Y2 PRINTCHR$240
1100 IFA=1THEN Y=1000 ELSE IFA=2 THENY1
     =600 Y1=1000 ELSEIFA=3THEN Y2=1000 Y=600
1110 IFA=10 THENVDU4 PRINTTAB(X%,Y%)"
     " BUL=BUL-5 EEE=0 TIME=0 T=0 VDU5 ENDPROC
1120 SCORE=SCORE+10
1130 FORQ=0TO3 SOUND1,-13,RND(50)+150,5 NEXT
1140 ENDPROC
1150 DEFPROCTABEL(NUM)
1160 IFNUM=2 THEN 1270
1170 VDU4 COLOUR2 PRINTTAB(10,1),"BULLETS=0"
1180 FORQ=1TO24 READD IFD=0THENPROCREST
     NEXT ELSE SOUND1,-10,D,5 NEXT
1190 VDU22,7,23,1,0,0,0,0 RESTORE
1200 PRINT'' CHR$129 CHR$141," LITTLE MEANIES"
1210 PRINTCHR$129 CHR$141 " LITTLE MEANIES"
1220 PRINT " Your score was " SCORE
1230 IFBUL 0 THEN PRINT'''" You had no bullets
     left" ELSE PRINT'''" The invade got you"
1240 PRINT 'CHR$130,CHR$136' PRESS THE SPACE
     BAR TO CONTINUE' VDU23,1,0,0,0,0;
1250 REPEAT A=GET UNTILA=32
1260 CLS RUN
1270 CLS
1280 PRINT'CHR$157CHR$141CHR$129," LITTLE MEANIES
1290 PRINTCHR$157CHR$141CHR$129 " LITTLE MEANIES"
1300 PRINTCHR$157CHR$130;"        by ALAN WINSTON"
1310 PRINT 'CHR$130 " Little Meanies is a
     game of skill, " CHR$130,"In which you have
     to shoot down many ",CHR$130 "invaders."
1320 PRINT' CHR$133 "To do this you have 2 guns on
     each side";CHR$133;"of your defence."
1330 PRINT''Keys for the guns are_ "''Q_UPPER GUN
     Z_LOWER GUN"
1340 PRINT CHR$136.CHR$134 " PRESS THE SPACE
     BAR TO PLAY"
1350 REPEAT A=GET UNTILA=32
1360 TIME=0 T=0 ENDPROC
1370 DATA129,129,0,129,129,0,129,129,132,145,145,0,
     101,101,0,101,101,0,109,109,109,117,101 101
1380 DEFPROCREST SOUND1,0,0,1 ENDPROC
1390 DEFPROCENEP
1400 X%=RND(5)+7 Y%=0
1410 Y%=Y%+1
1420 EEE=1 ENDPROC
1430 DEFPROCME
1440 IFY% 25 THEN EEE=0 VDU4 PRINTTAB(X%,Y%)"
     " VDU5 BUL=BUL+RND(3)+5 TIME=0 T=TIME ENDPROC
1450 VDU4 PRINTTAB(X%,Y%)," "
1460 COLOUR3
1470 Y%=Y%+1
1480 EEE=1 PRINTTAB(X%,Y%) CHR$245
1490 SOUND4 -10,200,1
1500 VDU5
1510 ENDPROC
```

Little Meanies
by Alan Winston

Arcade Avenue

3D Graphics

Ever on the lookout for new twists on old ideas to make a game stand out, some software companies have exploited the growing interest in spectacular graphics in particular 3D graphics to breathe new life into many of our old arcade favourites. Possibly the first of this type onto the market was *Haunted Hedges* written by Derek Brewster for Micromega. It was a 3D version of Pacman for the Spectrum which presented a slightly angled perspective on the screen and had the ghosts partially disappearing from view as they ran around the maze walls. Further games soon followed which exploited similar ideas. *4D* (sic) *Terror Daktil* from Melbourne House was essentially a space invaders/galaxian variant with the monsters enlarging as they peel off from the ranks and fly towards you.

This was one of Melbourne House's less warmly welcomed programs because, although it was quite a nice idea and fairly well executed, there seemed to be something missing with regard to playability. In fact, this is often true of games in this category — despite the flashy screen displays something has been sacrificed in terms of the excitement and tension of the original games.

One exception to this rule must be *Android 2* from Vortex software which presents another 'angled perspective' but this time in a game rather like *Frenzy* or *Berzerk*.

Vortex had an earlier program known as *Android 1* which was a reasonable version of the original two dimensional format but in *Android 2* they have produced a game that improves on the excitement and difficulty as well as providing some of the best graphics seen on the Spectrum. It is certainly the most outstanding piece of software I shall mention this week.

Turning to other machines, *Jumping Jack* from Sumlock for the CBM 64 is a game that I confess I have not played, but the screen shots in the adverts look entertaining with sideways views of the trucks, crocodiles and the like in a 3D version of *Frogger*. For the BBC, MRM Software have just released a range of games which includes *Q Man's Brother*, essentially a *3D Panzer* and, coming full circle, *3D Munchy* which is of course a *Pacman* game. Not surprisingly for the BBC the graphics are good enough to make the tradeoff with pace and addictiveness less painful. These games are not at all bad and are reasonably priced, although I must admit that I preferred MRM's original game *Diamond Mine* which, although much simpler in concept and screen display, was much more fun, frustrating and addictive. Anyway, all MRM games have a screen shot on the cassette inlay so what you see is what you get.

In summary, with one or two exceptions, the prefix 3D on these games often means you are being asked to substitute game quality for a more complex screen display and you should be aware of that before you buy. However, I am sure that this is a successful hook for breathing new sales into an old game and will be around for a long time. Even in the arcades similar ploys are appearing — *Zaxxon* is little more than a 3D version of *Scramble*, but there is no doubt that it's a winning game, and for once the 3D is used to add to the difficulty and skill of playing.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame) then write to Tony Kendle, Arcade Avenue, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD.

Halley's Comet
on Vic20

This program first draws the sun and earth proceeded by the path of Halley s comet. It then drawe a comet which proceeds around the path. To break you must press the space bar

Program notes

9-185	Prints dot path etc.
190	Read in data and checks if at the end
200	Sets up the place and colour of the comet
210-217	If comet reaches a point it flashes comet
220-225	Print a dot after it has passed
1000-	Data for positions

```
1 REM HALIES COMET
5 REM BY ANDREW LILLY
10 PRINT"THE PATH OF HALIES
   COMET"
20 PRINT
25 PRINT"■ .. "
26 PRINT"■.■ ■ ."
30 PRINT"■.■   "
40 PRINT"■. SUN ."
50 PRINT"■    ■●■. "
60 PRINT"■ .EARTH ."
70 PRINT" ■ .              "
80 PRINT"■     .          ."
90 PRINT"■ "
100 PRINT"■         .          ."
110 PRINT           †"
120 PRINT"■ PATH    .              ."
130 PRINT"■
140 PRINT"■                  .        ."
150 PRINT"■                   .       ."
160 PRINT"■                     .    ."
170 PRINT"■                       .."
180 PRINT
185 PRINT" PRESS ■SPACE ■TO EXIT READY
"
190 READP IFP=-1THEN RESTORE GOT
O190
200 A=P+38400 P=P+7680
210 POKEP,90
212 POKEA,6
215 FORD=1TO500 NEXT
216 IFP=7911THENFORG=1TO100 PRIN
T"■■■■■■■■■■■■■■■■■■■■←COMET"
217 IFP=7911THENPRINT"■■■■■■■■■■
■■■■■■■■■■■■■             " NEXT
220 POKEP,46
225 POKEA,0
227 GETZ$ IFZ$=" "THENPRINT"■" E
ND
230 GOTO190
500 FORR=1TO10000 NEXT
1000 DATA430,431,411,398,368,325
,277,231 194
1010 DATA130 92,60,67,88,110,132
,177,200,223,269,315,361 384,407
1020 DATA-1
```

Halley's Comet
by A Lilly

Microradio

GW6JJN

Radio teletype

Both this week's and next week's Microradios will be devoted to two very advanced programs recently released by G4IDE Micro Systems of 10 Fontwell Road, Wolverhampton, WV10 6PS

The two programs are devoted to two important aspects of radio-computing, namely radio teletype and slow scan television This week we'll deal with radio teletype (RTTY) The program comes in a cassette with RTTY4 for the 16K Spectrum on one side and RTTY5 for the 48K on the other Both load easily and faultlessly and the user is then asked for the time in hours and minutes When this is entered a real time clock is permanently displayed in the top left hand side of the screen This is the first time I have seen a real time clock on an RTTY program, but this was only the first of several surprises

The real criteria by which such a program must be judged is whether or not it will do the job it sets out to do, namely receive and transmit RTTY The answer to this in the case of the G4IDE program is an unqualified yes It receives and transmits RTTY superbly All that is needed in addition to the peogram is an interface and a terminal unit. Most people will have such things already but if not, the literature accompanying the program explains simply and in great detail how these units can be constructed They can also be purchased if required

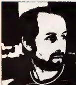
With my computer connected to a radio transceiver I was able to send and read RTTY so well thet I got a bit carried away and ended up writing this review at an unearthly hour The program is a pleasure to use and this is due not only to its efficiency but to the extras it contains I have already mentioned the clock which not only tells the time but will transmit the time automatically when required There are built in pages containing your callsign and test procedures — there are also 26 user definable stores into which all sorts of information can be saved for instant transmission. Another aspect of this program is the split-screen operation which means that your answer can be composed concurrently with the incoming message and sent at the press of a key

A further feature is the ability to capture the other stations callsign and automatically enter it into a store Space simply does not permit a full list of all the possibilities available but I must add that the peogram contains a routine to use the Spectrum as a frequency counter and as if this was not enough a baud rate checking routine is thrown in for good measure The literature even explains how to make a back up copy of the program which is refreshing and indicates an attitude of friendlinesss that is embodied in this excellent piece of software Roger Barker who wrote this program is a professional programmer and it shows in what must become the ultimate Spectrum RTTY program

Ray Berry GW6 JJN

This series of articles is designed for radio and microcomputer enthusiasts alike If you have any queries that you want answered hints and tips to share, or topics that you would like to see covered write to Ray Berry, Microradio, *Popular Computing Weekly* 12 13 Little Newport Street, London WC2R 3LD

Tony Bridge's Adventure Corner



Valhalla revisited

MC Lothlonen is well known for its war simulations — and now for a successful adventure *The Stolen Lamp* Written for the BBC this text-only adventure has become a popular and worthy addition to the range available for the Acorn micro

Mike Williams, of London N16 recently wrote to me with some tips for *Lamp* I haven't got room enough this week to pass them all on, so let's concentrate on one area this week. First off the coin:
BIUS/YRTE/HGEU/CIAR/REPD/ETTO

The message you must *Read* this to get the day's password which you will need
*TOO/NFLL/YYOT UHTE DCDA/ORRP SE!T

The sword may seem useful (you ithock off a few people here and there) but will eventually prevent you from winning the game You will find a column and a pillar in the entrance hall — there is an object in both of these, but, there is also a snag Should you smash both of them the ceiling will fall on you! From what I've told you so far you should have an idea what to do

More Hints 'n Tips from Mike's informative letter at a later date

Hadnan Hudson from West Yorkshire, writes asking for help in *Raaka-Tu* on his TRS 80 He has a few objects with him — the coin gold ring chopstick, idol and jewelled lever and he has a score of 20 out of a possible 50 Hadnan has to pass a statue in a triangular room, and to do so, has to give up the coin, thus losing 5 points Is there another way of passing the statue?

Also, how does he get over the oriental rug, concealing a trap, in the second room? Does he need the sword after killing the dragon, and the candle after killing the gargoyle? Quite a few questions there can anyone help? The problem with the statue sounds familiar from several other adventures — you may have to sacrifice the coin and try to retrieve it later by tempting the statue with a worthless bauble on your way back

"Dear Tony, in view of the wide interest in the difficult and absorbing program *Valhalla* will you please make urgent amends for your dreadful neglect of it in your pages? Best regards, Peter Jones, South Glamorgan."

"Dear Tony, where are all the *Valhalla* hints and problems? Surely a few million have been sold — is it so easy that no one has had problems or have they just thrown it in the bin because of its difficulty?"

These letters, from G Sim of Paignton, and Peter Jonse, are just a couple of the many I've received about Legend's adventure Mr/Ms Sim goes on to say "My hint to find Ofnir is — You need Boldir's help Another hint for Ofnir is
AGNO/KNEW/HIAN/ LKLR

I have to admit that I haven't mentioned *Valhalla* as often as other adventures such as the Scott Adams series *Knight's Quest* and *The Hobbit* In fact, only twice (Vol 2, No 24 and Vol 3 No 10) to 12 Corners dedicated to *The Hobbit* In some ways this reflects my own feelings about *Valhalla* — if I have a few hours to spare, staring at the screen, then I go to *Valhalla*, and can only admire the graphics But it is not my favourite program

Actually as I've said before *Valhalla* seems more like a computer movie, whose proceedings can be influenced in some degree by the player I find clues difficult to give as each action depends so much on what the player has done before In the space I have each week I can't even begin to scratch the surface so I'll draw your attention to this month's issue of *Popular*'s sister magazine *Micro Adventurer* (if you're a keen adventurer you'll have taken out a subscription!) in which Mike Stockwell has written the definitive article on solving *Valhalla* Read this and all should become ... well a lot clearer than it may be at the moment!

D A Booth has written with several very useful clues "Hunt in the far-flung corners of the world for the key top success — befriend the iron man he may have a crowbar — if you cannot get on with your valuables trust a weak friend — befriend your enemy to make the top of hell ring — there must be give and take to find protection"

John Rumble from Aldershot has given me a couple of hints that might also be useful He says "A good move is to throw a fireball at Krank when in Krank's Hall To get Drapnir
DOAP/SEKN SCAH/GEAS/TTOI/PNLI/ACCE/EWO-A/FSNT'IERI WNH/CEHL/E*SA/TN

Phew! I hope you can decipher that lot — as usual starting from the *second* letter read off every other letter then return to the *first* and repeat the process The slashes (/) are to break up the letters for ease of reading

R Smith, of Rushden has a couple of queries (accompanied by several maps of other adventures he has completed, for which much thanks First of all "What is the significance of the various flags going up and down?" — I think that is probably just a bit of gratuitous animation, but maybe someone else knows better "If a number is entered the program responds 'there is no crown here' No mention of a crown in the instructions' No, except that the crown is Norse currency!



Valhalla needs more space than I have this week — if someone who has persevered more than I and has completed a fair amount, would like to write and let me have a few more clues particularly to later parts I can pass them on By the way, a version of Valhalla for Commodore 64 is now delayed until late May

At the recent ZX Microfair at Alexandra Palace in London Crystal Computing were showing the old favourite *Halls Of The Things* You may remember that I quite enjoyed this program some time ago — it's not strictly an adventure but does contain some of the elements of fantasy "Troll-bashing" I'm glad to see that one fan thinks enough of the program to set up the *HOTT Appreciation Society* For £1 membership, fellow fans will receive quarterly newsletters with hints on playing special offers and so on Sounds good! Write to

HOTT Appreciation Society
8 Winchester Road
Bromley
Kent
BR2 0PZ

(and tell 'em you read it here!)

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed, or if you're stuck in an Adventure and cannot progress any further write to Tony Bridge, Adventure Corner, *Popular Computing Weekly* 12-13 Little Newport Street, London WC2R 3LD

Peek & Poke

LEADING QUESTION

J Mills of Bromley, Kent writes

Q **Having a ZX Spectrum with Interface I and Micro Drive, can you please inform me if I purchased a RS232 Sinclair lead, would this make the Spectrum compatible with the Silver-Reed EX43 Electronic Typewriter/Printer, without purchasing their Memorymatic M40/44 or Interface I/F40?**

A I don't actually know the device concerned but as long as it has a standard RS232 interface port then you will be OK

If you are in any doubt as to the cables or extra interfaces that you may need then I suggest that you consult Maplins (not the holiday camp) catalogue (available at most computer book shops and a number of high street retailers)

WAITING GAME

J Roberts, Glenconner, Liverpool, writes

Q **May I please have your comments regarding the ethics of offering programs to software companies for evaluation?**

The particular aspect I have in mind concerns the period of time elapsing between the companies' receipt of a program and its evaluation.

I sent a program to a company about 10 weeks ago. I received their acknowledgment by return post but since then I have heard nothing. I rang them about 2 weeks ago and the reply was thet they receive many programs and each is dealt with in rotation. The inference I drew from this was that I would just have to wait.

My program is an adventure type, and the theme is one which as far as I can tell, has not been covered before.

I am therefore very anxious to get my program properly evaluated before someone else "thinks" of my idea.

Would you consider it right to offer a program to several companies within a few days and then to sit back and wait for the first acceptance?

A Although I think that it is unrealistic to expect any company to give a game a real evaluation in anything under 2 weeks it is fair to say that 10 weeks is nothing short of disgraceful You would be advised to demand the return of your game and not to have any more dealings with this company

You don't say which computer your game is for but I suggest that you choose a company that has published adventure games for your machine and submit it to them As to ethics, I personally would not submit a program to more than one company at a time Two rejections a month are enough for anyone

THERMAL PRINTER

Nicky Bell of Western Ave, Dagenham, writes

Q **Could you tell me if there is a six - inch plain paper thermal printer suitable for my Spectrum?**

If so, what interface would I need to connect it?

A Epson have just launched something that sounds what you require It's a plain paper thermal printer with a number of different printing styles that retails for £95

There are two versions for both Centronics and RS232, although the latter is the one available first (around August) There are a number of different centronic interfaces from Kempston, Hilderbay, Tasman, etc All cost around £45 and all can be recommended For RS232, you could do worse than get an Interface I—the official Sinclair interface You will then need a lead to connect this to a five pin din which is the socket on the printer

RIGHT TO LEFT

Philip Aston of Pensham, Perstore, Worcs, writes

Q **Please could you tell me how to make the screen on the 48K Spectrum scroll from right to left, as I need it for a game I am making?**

A This is one of those questions where I could really go over the top I mean, do I tell you how to scroll the screen left a pixel at a time, or a character at a time? Do you need to know how to scroll the attributes file similarly (*Ink*, *Paper* etc)? I think my best approach is simply to recommend an extemely useful book, *Supercharge Your Spectrum*, published by Melbourne House, which is full of machine code routines to make the programmer's life easier

It also contains all the routines necessary for screen-scrolling left or right

NEW ASSEMRLER

Colin Eames of Queen's Drive, Swadlincote, Burton-on-Trent, writes

Q **As a novice machine-code programmer on my 48K Spectrum, I would very much like to purchase an assembler**

Can you give me the address of a low cost, easy to use assembler?

A If you really want to get into machine-code programming on the Spectrum, then I can recommend an assembler/monitor from Hisoft called Devpac It is available from Hisoft mail order at 60 Hallam Moor, Liden, Swindon, Wilts SN3 6LS

The price of £14 00 may seem high, but you are getting two programs, both of which you will need

DISABLED DRAGON

Paul Bailey of Brynton Road, Macclesfield, Cheshire, writes

Q **Please, if possible, could you tell me how to disable the *Break* key and *Reset* button on my Dragon 32.**

A To disable the *Break* key, enter the following Direct-mode

Poke 411,228
Poke 412 203
Poke 413 4
Poke 414,237
Poke 415,228

Then, to "turn off" the Break key use

Poke 410,236

COMPUTER GAMBLE

R Kidd of Stoke Park Ipswich, writes

Q **I have seen people advertising their computer for sale by offering raffle tickets. Can I do this myself, ie, is it legal? If not, what is the best way of selling my computer?**

A This is a complex one We consulted our legal experts and the conclusion seemed to be that it is quite possible you would be infringing laws against Gaming and Gambling A much better way of selling your computer is to put a free advert in our Computerswop column You can ask for, and get, a reasonable price if your computer is in good condition

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Address *14 Evenlode Close, Lodge Park, Redditch Worcs BG8 7NA*

Micro *Commodore Vic 20*
Adventure
Problem *If there is a word processing chip in Vic + if there is a poke to get a beep every time you hit a key*
Name *Karl Halton*
Address *4 Etherow Brow, Broadbottom Cheshire SK14 6AA*

Micro *TI 99/4A*
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Address *The Hill, Langport, Somerset TA10 9PY*

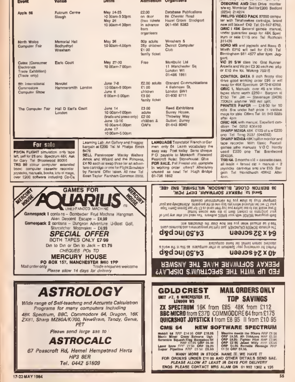
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Adventure *The Hobbit*
Problem *I cannot get through the large trap door in the elvenkings cellar I am always thrown back into the dungeon Please help me!!!*
Name *Tim Appleyard*
Address *453 Chester Road Woodford Stockport Cheshire SK7 1QP*

Micro *Commodore 64*
Adventure *The Hobbit*
Problem *I cannot get through large trap door in the elvenkings cellar I am always thrown back into the dark dungeon Please help me!!!*
Name *Tim Appleyard*
Address *453 Chester Road, Woodford Stockport Cheshire SK7 1QP*

Micro *Spectrum 48k*
Adventure *The Lost Gnoms (Adventures of Eric Ream)*
Problem *How can I awaken Snort the Gnome?*
Name *D Peberdy*
Address *19 Oxgate Court Coles Green Road Brent NW2*

Micro *48k Spectrum*
Adventure *Hewson Consultants "Quest"*
Problem *I can unlock the castle door but not open it*
Name *Peter Harrison*
Address *43 Cresent, Chester Moor County Durham, DH2 3RT England*

Micro *Commodore 64*
Adventure *Hobbit*
Problem *I can not get out of the Goblins dungeon I can not escape from the "pale bulbous eyes" and I would like to get the ring!*
Name *Neil Phillips*
Address *11 Lansdowne Cres Werrington Stoke-on-Trent Staffs ST9 0LL*



Diary

Event	Venue	Dates	Admission	Organisers
Apple 86	Fulcrum Centre Slough	May 24-25 10 30am-5 30pm May 26 10 30am-4 30pm	£2.00 on door (free tickets in advance from organisers	Database Publications 86 Chester Road Hazel Grove Stockport 061-456 8383
North Wales Computer Fair	Memorial Hall Bodhyfryd Wrexham	May 26 10 00am-4.00pm	50p adults 25p children £1 00 family ticket	Wrexham & District Computer Club
Cetex (Consumer Electronics Trade Exhibition) (Trade only)	Earls Court	May 27-30 10 00am-7 00pm	Free	Montbuild Ltd 11 Manchester Sq London W1 01-486 1951
5th International Commodore Computer Show	Novotel Hammersmith London	June 7-8 10 00am-6 00pm June 9 9 00am-5 00pm	£2.00 adults £1 00 children £3 00 family ticket	Granard Communications 4 Babmaes St. London SW1 01-930 6711
The Computer Fair	Hall D Earl's Court London	June 14 10 00am-6 00pm (trade and press only) June 15-16 10 00am-6.00pm June 17 10 00am-5 00pm	£3 00 adults £2 00 children & OAPs	Reed Exhibitions Surrey House, Throwley Way Sutton Surrey 01-643 8040

For sale

PSION FLIGHT simulation only tape left, sell for £6 ono Spectrum 48K Ask for Gary Tel Brookwood 80056

TRS 80 colour computer extended basic computer cassette recorder joysticks, manuals, books, lots of mags, over £200 software including Co-Co Learning Lab Art Gallery and Frogger bargain at £200 Tel M Phelps Bisan 5476

SELL Paratrooper Wacky Waiters Amok and Wizard and the Princess, £4 50 each or swap three for an adventure cartridge or one for Flight Simulator by Ferranti Offer taken. All new Tel Sean Taylor Farnham Common 2922.

LANGUAGE Translator French or German only £4 Learn vocabulary the easy way Post today Send cheque P O payable to Monksoft Foxwood Pearcroft Road Stonehouse Glos

FOR SALE. Pet Prestel unit complete In working order offers? Absolutely unused as new! Tel Hugh Bridge 01-736 1862

ORIC 48K, perfect condition cassette recorder worth £100 Does any game any speed Inc. Hobbit Trog Chess Ice-Chint, Abra, worth £200 Highest that Andy 443 1460 after 7pm only

OSBORNE AND Disc Drive monitor s/w eg. Wordstar Sell for £200 Bedford (0234) 214274

PHILIPS VIDEO PACK 97000 computer with Terahawkes cartridge, brand new still boxed £40 Tel 01-567 6762.

ORIC I 48K Several games manual, under guarantee swap for 48K Spectrum or sale £115 ono Tel Rushden 311426

SORD M5 and joypads and Basic G Worth £210 will sell for £170 Tel Birmingham 561 4577 after 6pm Juggant.

VIC 20 S/W tiles inc Grid Runner Arcadia and Vic pnl £3 30 each inc p&p or £10 the lot. Woking 70316

CONTROL DATA 8 inch floppy disc drive good working order £95 or will swap for 48K Spectrum 0672-810858

ORIC 1, Manuals over 45 s/w titles, tapes alone worth £250+ Bargain at £150 Tel Jim — Stevenage (0438) 720624 anytime Will not split.

PRINTER PAPER — £18 00 for 10 rolls S/w under half price + various mags for sale Offers Tel 01 949 0225 after 4pm

ORIC 48K with manual. Excellent condition Tel 0252 836410

SHARP MZ80A 48K £125 of s.w £230 ono Tel Tring 2037 (044282)

SHARP MZ80A 48K built in monitor and tape recorder With Basic Pascal games also manuals V G C Hardly used £220 ono Tel Brentwood 224338.

TI99/4A 3 months old + cassette case, all leads + forxed etc + manual + 2 joysticks cartridge and s/w £85 Bargain Tel Hornchurch 42642 After 4pm.

New Releases

PROTECTED

Haunted Abbey is the first of A&F's games to feature its new protection device designed by Jim Lamont

It was deliberately chosen as the first program to feature the new protection, because it was of sufficiently high quality to ensure that people would (hopefully) want to buy it rather than just copy it from friends

The game is an adventure where you must find Plube's Book of Incantations and collect treasure from an abbey The text is full of extremely bad puns and the kind of puzzles that keep Tony Bridges occupied for months To add to the strictly intellectual problems, there are a large number of horrible monsters

Program	*Haunted Abbey*
Price	*£7 90*
Micro	*BBC*
Supplier	*A&F Software* *Unit 8* *Canalside Industrial Estate* *Woodbine Street East* *Rochdale Lancs* *OL16 5LB*

READ & WRITE

Acos+ is a utility program for the Commodore 64 by Melbourne House, usually known for more adventure orientated offerings

Very unusual it is too Partly it is pretty much your standard additions to Basic in sprite and sound but this is really a lesser aspect of it More important is what *Acos+* enables you to do with the standard Commodore data recorder

Firstly it speeds up the tape operation In addition it gives you a number of other facilities which let you use the recorder rather like a disc drive

You can form a directory of various programs on tape and save and load using *Csave* and *Cload* You can also open channels to Read or Write to and from the file

Program	*Acos+*
Price	*£8 95*
Micro	*Commodore 64*
Supplier	*Melbourne House* *131 Trafalgar Road* *London SE10*

HIGH PRICE

Atari has finally released its authentic version of *Pacman* for the Spectrum — indeed it is the company's first Spectrum release

And what you get is quite astonishingly accurate with even the sound effects derived from the Spectrum's pathetic bleeper sound true to the original

If you haven't yet got a version of the game and are one of those poor souls horribly addicted to the ludicrous thing this would be the one to get if it wasn't for the unbelievable price — what do Atari think they're doing?

Program	*Pacman*
Price	*£14 99*
Micro	*Spectrum*
Supplier	*Atari* *Retail stores*

HI-SPEED

High Speed Dragon is a very useful utility that enables you to keep files of programs on a single long tape and access them quickly

The secret of the system is that it uses the cassette recorder on fast forward to find the program required, how fast this runs — which varies from machine to machine — is the determining factor on access times

It's a simple idea which a lot of home programmers could find useful and at £3 95 (with instructions that actually encourage you to copy the program) it's excellent value

Program	*High Speed Dragon*
Price	*£3 95*
Micro	*Dragon*
Supplier	*Omega Systems* *44 Curlew Road* *Abbeydale* *Gloucester* *GL4 7TP*

ROMAN MAP

The Fall of Rome is a strategy game with a number of nice features making it more accessible to the ordinary player (ie rather than the committed wargamer)

You control the Roman forces and attempt to rewrite history by marshalling your armies over the plains of Europe to defend the Empire from the assorted unwashed tribes

You play against the computer deciding when and where



to move your forces and whether to concentrate on attacking or defending

Although the program seems to be largely in Basic and is therefore technically unspectacular features like the hi-res map of Europe and beautifully redesigned character set make it well worth looking at if you like this kind

Pick of the week

IN PERSPECTIVE

Battle Planet for the BBC is an excellent version of the arcade game which was, in some versions at least known as *Buck Rogers*

Although the game is essentially only an 'avoid everything for as long as you can as the odds gets more and more insuperable you lone heroic defender of the earth arcade shoot em up (Molly Bloom eat your heart out) it has a number of features to lift it well above the run of the mill

For one thing it is 3D — at least in the sense that at least one or more objects in the screen is drawn with some sort of perspective In this case it is a trench, zooming through which is your lone defender of the free and etc — the illusion of zooming is convincingly done

The object of all this rushing about is to destroy a battle planet which is threatening earth — naturally it is aided and abetted by numerous assorted baddies who must be either avoided or shot down It's very addictive and graphically very impressive

Program	*Battle Planet*
Price	*£6 95*
Micro	*BBC*
Supplier	*ISP Marketing* *Hampstead House* *New Town Centre* *Basingstoke* *Hants*

of [illegible] game

Program	*The Fall of Rome*
Price	*£6 99*
Micro	*Spectrum/BBC/CBM 64/Atari*
Supplier	*Argus Press* *1 Golden Square* *London W1R 3AB*

EVERY BYTE

Not one for the home user at £500 but of interest to small software houses is a tape protection device called *Rapid*

What you get for your money is two Eproms that sit in the Spectrum expansion port and protect your program from all but the most hi fi tape to tape copiers

The system uses three different methods of protection firstly it uses its own special loading routine, quite different from the one in Rom cracked by most of the copier programs.

It saves programs at twice the usual speed which is why most conventional tape to tape copying will not work — finally, it fills every byte of Ram making programming techniques very difficult to copy

With this and some other recent developments from A&F software, it looks like it's getting harder and harder to earn an honest dishonest living

Program	*Rapid*
Price	*£500*
Micro	*Spectrum*
Supplier	*Expert* *4 Lade Poulton Lane* *Poulton* *Blackpool FY6 7ET*

PROVERBIAL

Educational software on the Oric is few and far between, and what there is tends to be pretty dull — as with the Spectrum until recently

Story Book from Softbacks is slightly more successful than most, perhaps because it is very simple indeed.

The whole program works on the principle of filling in missing words. It offers a number of proverbs with gaps to be filled in by the child The text is large and bold. Right and wrong answers are accompanied by as appropriate, a smiling or frowning face

You can enter your own stories and use them in the same way as the proverbs, asking the child to type in missing words

Program	*Story Book*
Price	*£4 95*
Micro	*Oric*
Supplier	*Softbacks* *PO Box 257* *Watford WD1 3LQ*

LIBERATOR

The Adventures of Robin Hood is an arcade/adventure for the Atari in which the well known Marxist wealth liberator steals bags of gold and is rejuvenated by a kiss on the imprisoned cheek of maid Marion

Actually the game has very little to do with adventures at all it's all about running up and down firing arrows and avoiding the sheriff's men — but it s still good fun for all that

As Tony Bridge has said before now Atari programs have excellent graphics but always cost an arm and a leg *Robin* is no exception by English software are by no means the worst offenders — £9 95 is not commonly excessive for a 16K Atari program

Program	*The Adventures of Robin Hood*
Price	*£9 95*
Micro	*Atari*
Supplier	*English Software* *Box 43* *Manchester M60 3AT*

BEWILDERING

Astrosoft are a new software house concentrating on the Spectrum market (which is asking for trouble)

Among its first releases are two adventures *Thief* and *The Pink Pearl* The latter is a text adventure in which you seek out the mysterious and valuable Pink Pearl fighting off baddies and solving clues as you go

The program looks very neatly designed with some evocative descriptions and bewildering puzzles — another nice touch is that certain baddies can only be killed with certain weapons

From the look of the program (and I could be wrong) I'd say it was written with the Quill and on the pre-production version of the game I have there is no credit given I assume it s an oversight

Program	*The Pink Pearl*
Price	*£4 95*
Micro	*Spectrum*
Supplier	*Astrosoft* *101 Church Road* *Ferndown* *Wimbourne* *Dorset* *BH22 9ET*

FLEXIBLE

Scope is a programming language originally developed for the Spectrum and now implemented on the Commodore 64

Unlike programs like *Games Designer* you actually have to write a program with scope, rather than make choices from a menu Scope consists of a number of commands held in Basic Rem statements Although this may mean that the program is less easy to use than some of its competitors, it is, conversely, much more flexible

Using the *Scope* language, which is no more difficult to grasp than Basic you gain machine code speed of execution of graphics and sounds The package includes some demo programs and an extensive manual which explains the language and contains listings of the Demo routines, so that you can steal them for your own use

Program	*Scope*
Price	*£17 95*
Micro	*Commodore 64*
Supplier	*ISP Marketing* *Hampstead House* *New Town Centre* *Basingstoke* *Hants*

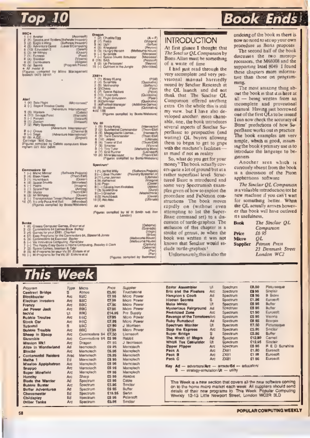
HALL OF FAME

There is, contrary to popular belief, Lynx software around provided you know where to look for it and some of it is good — if unoriginal A case in point is *Centipede* from Play It software

Written in machine code, the game has all of the features of the arcade original including a bouncing spider and a horticultural hall of fame I liked the concise instructions which explained that the object was to shoot everything that moves and everything that doesn t

Program	*Centipede*
Price	*£5 95*
Micro	*Lynx*
Supplier	*Play It* *29 Sleaford Road* *Boston* *Lincs* *PE21 8EY*

New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12 13 Little Newport Street WC2R 3LD



Top 10

BBC✦
1 (–) Aviator (Acornsoft)
2 (6) Spooks and Spiders/Stratobomb (Software Invasion)
3 (2) Eagle's Wing (Software Invasion)
4 (5) Adventure Quest (Level 9 Computing)
5 (13) Education 2 (Golem)
6 (3) Mr Wimpy (Ocean)
7 (1) Fortress (Pace)
8 (4) Snooker (Visions)
9 (8) Cambusters (Alligata)
10 (9) Spook (Program Power)
✦ All model B
(Figures compiled by Micro Management Ipswich 0473 59181)

Atari
1 (4) Solo Flight (Microprose)*
2 (–) Saga 4 Voodoo Castle (Adventure International)*
3 (5) Warlock (Calisto)
4 (10) Savage Pond (Starcade)
5 (–) Pooyan (Datasoft)
6 (1) Zaxxon (Datasoft)
7 (2) Rally Speedway (Adventure International)*
8 (–) Circus (Channel 8)
9 (–) Saga (Adventure International)*
10 (9) A.C.E. (English)
Cartridge 48K Disc
(Figures compiled by Calisto computers Birmingham 021 632 6458)

Commodore 64
1 (–) Manic Miner (Software Projects)
2 (4) Black Hawk (Thorn/EMI)
3 (1) Hunchback (Ocean)
4 (8) Space Shuttle (Microdeal)
5 (–) Pedro (Imagine)
6 (–) Space Pilot (Anirog)
7 (5) Slurpy (Thorn/EMI)
8 (3) Mr Wimpey (Ocean)
9 (–) Transylvanian Tower (Richard Shepherd)
10 (7) It's only Rock and Roll (Microdeal)
(Figures compiled by Boots/Websters)

Books
1 (8) Creepy Computer Games, Ersten et al (Osborne)
2 (3) Commodore 64 Games Book Bishop (Granada)
3 (4) Games for your ZX81 Charlton (Virgin)
4 (7) Easy Programs for the Commodore 64, Stewart & Jones (Shiva)
5 (5) Commodore 64 Exposed Bayley (Melbourne House)
6 (–) Vic Innovative Computing Ramshaw (Melbourne House)
7 (–) The Really Easy Guide to Home Computing, Beasley & Clark (Century)
7 (2) Space Games, Isaacman & Tyler (Osborne)
9 (5) 60 Programs for your Vic 20 Erskine et al (Pan)
10 (–) 60 Programs for the Vic 20 Erskine et al (Pan)
(Figures compiled by Bookmasters)

Dragon
1 (2) Chuckie Egg (A & F)
2 (7) Pedro (Imagine)
3 (4) Ugh (Softek)
4 (5) Kriegspiel (Beyond)
5 (3) Hungry Horace (Melbourne House)
6 (–) Scramble (Microdeal)
7 (–) Space Shuttle Simulator (Microdeal)
8 (10) SAS (Peaksoft)
9 (9) Up Periscope! (Beyond)
10 (–) Cuthbert in the Jungle (Microdeal)

ZX81✦
1 (1) Krazy Kong (PSS)
2 (2) Scramble (Quicksilva)
3 (5) Mothership (Softsync)
4 (2) Chess (Psion)
5 (7) Space Raiders (Psion)
6 (10) Asteroids (Quicksilva)
7 (6) Flight Simulation (Psion)
8 (9) Defender (Quicksilva)
9 (4) Football Manager (Addictive Games)
10 (8) Invaders (Quicksilva)
✦All 16K
(Figures compiled by Boots/Websters)

Vic 20
1 (6) Krazy Kong (Interceptor)
2 (2) Submarine Commander (Thorn/EMI)
3 (8) Megagalactic Llamas... (Hewson)
4 (3) Tank Commander (Thorn/EMI)
5 (10) Jetpac (Ultimate)
6 (4) Tower of Evil (Thorn/EMI)
7 (8) Snooker (Visions)
8 (–) Tiny Tutor (Marketing Micro)
9 (7) Grid Runner (Llamasoft)
10 (9) Mine Madness (Thorn/EMI)
(Figures compiled by Boots/Websters)

Spectrum*
1 (1) Jet Set Willy (Software Projects)
2 (–) Blue Thunder (Foundry Systems Ltd)
3 (7) Lunar Jetman (Ultimate)
4 (9) Alchemist (Imagine)
5 (6) Pogo (Ocean)
6 (–) Escape from Krakatoa (Abbex)
7 (3) Space Dive (Durell)
8 (–) Gnasher (Mastertronic)
9 (5) Hunchback (Ocean)
10 (8) Atic Atac (Ultimate)
All 48K
(Figures compiled by W H Smith and Son London)

Book Ends

INTRODUCTION

At first glance I thought that *The Sinclair QL Companion* by Boris Allan must be something of a waste of time.

I had just read through the very incomplete and very provisional manual hurriedly issued by Sinclair Research at the QL launch, and did not think that The Sinclair QL Companion offered anything extra. On the whole this is still my view, but I have also developed another, more charitable, one, the book introduces several aspects of Sinclair SuperBasic to prospective (and waiting) QL buyers allowing them to begin to get to grips with the machine's facilities — in mind if not in reality.

So, what do you get for your money? The book actually covers quite a lot of ground but at a rather superficial level. Structured Basic is introduced and some very Spectrumish examples given of how to exploit the procedure and FuNction constructions. The book moves rapidly on (without even attempting to list the SuperBasic command set) to a discussion of turtle-graphics. The inclusion of this chapter is a stroke of genius, as when the book was written it was not known that Sinclair would include turtle-graphics!

Unfortunately, this is also the undoing of the book as there is now no need to set up your own procedure as Boris proposes.

The second half of the book discusses the two microprocessors, the M68008 and the supporting Intel 8049. I found these chapters more informative than those on programming.

The most amazing thing about the book is that it is here at all — being written from an incomplete and provisional manual. Having just borrowed one of the first QLs to be issued I can now check the accuracy of Boris' predictions of how SuperBasic works out in practice. The book examples are very simple, which is good, assuming the book's primary use is to introduce the language to beginners.

Another area which is curiously absent from the book is a discussion of the Psion applications software.

The Sinclair QL Companion is a valuable introduction tot he new machine if you can't wait for something better. When the QL actually arrives however this book will have outlived its usefulness.

Book	*The Sinclair QL Companion*
Price	*£6 95*
Micro	*QL*
Supplier	*Pitman Press 23 Denmark Street London WC2*

This Week

Program	Type	Micro	Price	Supplier
Contract Bridge	S	Atmos	£5.95	Touchstone
Blockbuster	Arc	BBC	£7 95	Micro Power
Electron Invaders	Arc	BBC	£7 95	Micro Power
Frenzy	Arc	BBC	£7.95	Micro Power
Jet Power Jack	Arc	BBC	£7 95	Micro Power
TecVid	Ut	BBC	£14.95	Pre Supply
Rubble Trouble	Arc	BBC	£7 95	Micro Power
Stock Car	Arc	BBC	£7.95	Micro Power
Tuskmill	S	BBC	£7 95	J Morrison
Bubble Trouble	Arc	BBC	£7 95	Micro Power
Sheep in Space	Arc	Commodore 64	£7.50	Llamasoft
Skramble	Arc	Commodore 64	£5 95	Rabbit
Mission Mk1	Arc	Dragon	£6 95	J Morrison
Alice in Wonderland	Ad	Memotech	£9 95	Memotech
Blocbe	Arc	Memotech	£6.95	Memotech
Contenental Raiders	Arac	Memotech	£6.95	Memotech
Maths 1	Ed	Memotech	£8 95	Memotech
Mission Appiphetron	Arc	Memotech	£6 95	Memotech
Snappo	Arc	Memotech	£6 95	Memotech
Super Minefield	Arc	Memotech	£9 95	Memotech
Hunchy	Arc	Sharp	£5 95	Abacus
Blade the Warrior	Ad	Spectrum	£5 95	Cable
Bubble Buster	Arc	Spectrum	£5.95	Sinclair
Buffer Adventures	Ad	Spectrum	£5 95	Buffer
Chessmaster	Ed	Spectrum	£15.95	Serin
Childsplay	Ed	Spectrum	£8 95	Polarsoft
Driller Tanks	Arc	Spectrum	£5.95	Sinclair
Editor Assembler	Ut	Spectrum	£8.50	Picturesque
Eric and the Floaters	Arc	Spectrum	£5 95	Sinclair
Hampton's Court	Ad	Spectrum	£8 95	B Sides
Hidden Secrets	S	Spectrum	£1.95	Eurosoft
Make Music	Ut	Spectrum	£5 95	Buffer
Mysterious Fairground	Ad	Spectrum	£8 95	Buffer
Restricted Zone	Arc	Spectrum	£1 50	Eurosoft
Revenge of the Tomatoes	Arc	Spectrum	£5 95	Visions
Ruby Runabout	Ad	Spectrum	£6 95	Scorpio
Spectrum Monitor	Ut	Spectrum	£7.50	Picturesque
Stop the Express	Arc	Spectrum	£5.95	Sinclair
Super Bridge	S	Spectrum	£5.95	Buffer
The Wrath of Magra	Ad	Spectrum	£12.90	Carnell
Which Tax Calculator	Ut	Spectrum	£12.95	Sinclair
Zipper Flipper	Arc	Spectrum	£8 95	R E D Sunshine
Pack A	Arc	ZX81	£1.80	Eurosoft
Pack B	Arc	ZX81	£1 95	Eurosoft
Pack C	Arc	ZX81	£1 95	Eurosoft

Key Ad — adventure/Arc — arcade/Ed — education/ S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, Popular Computing Weekly 12-13 Little Newport Street, London WC2R 3LD



Brought to book

As you well know the US government is very worried about the leaking of high technology secrets to the USSR

The British M16 department have managed to intercept this KGB missive Before it found its way into the diplomatic bag the KGB managed to obtain this information from breaking into the FBI s offices in Washington The FBI had intercepted a microwave transmission from a satellite to the CIA s offices (also in Washington)

The CIA bugged the offices of a high technology publisher and its intelligence was in the form of a transcript of the conversation

At some points the implications for the transfer of high technology information in printed form are breath-taking in scope

The information from M16 is made available for reproduction here by kind permission of a cleaner on Crewe BR Station

This information should be presented to the public as a matter of public duty but unfortunately the transcript seems rather incomplete

Transcript Part 1

Publisher Are you sure?
Author 1 I'm positive There s nothing I can do about it.
P So you can't understand the manual It would help if you could you know After all, if you re writing about the Hype computer you should be able to understand the manual
A1 I know, but when I signed up to do this Hype book I expected to be able to do a manual re-write add in a few old examples and pretend it allowed you to *Make more of your Hype* The manual s so bad that it s impossible to re-write it.
P Will the punters be able to understand your book?
A1 No
P Right. In that case we'll call it the *The Advanced Hype* so that if they can t understand it they ll blame themselves. And we ll add an extra quid on to the price
A1 Anybody who buys a Hype has to be an idiot will they be able to read?
P Good thinking. We ll charge an extra two quid, they won't know the difference Do you want to write a book on this new computer called the Con? You could write a games book, called Con *Tricks*.

Transcript Part 2

Author 2 Well It s very simple There s this thing called a disassembler and what I do is make it listing out the memory on a printer while I go to the pub When I come back I rip off the listing add a few words a few standard bits about machine code and call it *The Hype Rom: The Disassembly* You use it as camera-ready copy, and it s dead cheap As it s about the Hype we can charge a lot. There s this new micro called the Con I could do it for that as well Interested?
Publisher Yes Call it *Understanding the Con*

Transcript Part 3

Publisher Lots of people are interested in machine-code because of the games We need something on machine-code for the Hype — didn t you write a machine-code book for the Pancake?
Author 3 Yes but it fell a bit flat.
P It s the same chip isn t it?
A3 I don't know but I suppose I could find out Doesn t really matter what it is it s all standard stuff I ll search out the disc with the Pancake book on — I'll be able to use large chunks of it.
P Good that s settled All you have to do is pretend that machine code is easy and it s useful and we can charge an extra quid 'cos it s machine-code What chip does the Con use?

Transcript Part 4

Secretary It's a just been on the news, Hype have crashed!
Publisher [Expletive deleted]

Boris Allan

Change of address

Puzzle No 107

The middle-European principality of Nonentia is in a state of confusion. The good but eccentric King Umberto has declared that the country must go hexadecimal Whether this is a result of the birth of his sixteenth child or the present of a new computer — officially to keep the palace accounts but supplied with lots of *Space Invader* software — isn t clearly known

On H day the date arranged for the changeover all addresses must be converted from decimal to hexadecimal. The only praise for the King s decision comes from the local brass works who are doing a roaring trade in metal numbers for the house doors!

Not that all this affects old Bungo the cobbler He lives at number 53 and is quite pleased that all

53

he has to do is to re-arrange the numbers to make 35 — his new number — as 53 in decimal is 35 in hex

If no address has more than three digits, what other numbers are the same as old Bungo s?

Solution to Puzzle No 102

One of the easier puzzles Almost certainly it is better tackled on the back of an old envelope rather than using a micro sledgehammer

However a program can be written to solve it like the one below It tests all numbers from 10 upwards and points out those that form their reverse when added as described in the question

```
10 LET N = 10 20 LET T = N 30 LET N$ = STR$ N 40
GOSUB 200 50 LET N$ = STR$ T 60 GOSUB 200 70
LET M$ = "" 80 LET N$ = STR$ T 90 FOR M = 1 TO
LEN N$ 100 LET M$ = N$(M) + M$ 110 NEXT M 120 IF
VAL M$ = N THEN PRINT N, M$ 130 LET N = N + 1
140 GOTO 20 200 FOR M = 1 TO LEN N$ 210 LET T =
T + VAL (N$(M)) 220 NEXT M 230 RETURN
```

It finds only two solutions 12 which is Chris s age and 69 which must be his grandfather s age

Winner of Puzzle No 102

The winner is Andrew Turek The Vale London NW11 who receives £10

Rules

The closing date for entries to Puzzle No 107 is June 1

The Hackers

Who's that over there?
Old Bob you mean?
Sad story that,-he used to be one of the best, but he's over the hill now.
Nobody's tried to pirate any of his programs in months.


but seriously AUTOMATA
PIMANIA — the cult adventure that's for real!
16K ZX81 £6 BBC 32K £10 Dragon 32 £10 Spectrum 48K £10
GROUCHO — the Pimania sequel, Concord-QE2 USA prize
Free rock music on the flipside Spectrum 48K £10
PI EYED — the comedy cartoon arcade game starring the PiMan. Free protest disco record Spectrum 48K £6
PI-BALLED — A triumph of the arcade programmer's art
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UNCLE GROUCHO HAS BEGUN HIS JOURNEY BACK TO THE STATES, AND THE PIMAN AND LADY CLAIR, UNAWARE THAT MORRIS IS BEING AGAIN MENACED IN THE CAR PARK BY HELL'S RATBAGS, MEET UNCLE ARNOLD AND HIS MATE, RASTAPIMAN IN A PUB, WHERE THEY ARE WAITING TO PLAY ANOTHER TEAM AT "DARTZ"
WHY IS IT THAT WHEN YOU CAME IN YOU SOUNDED LIKE SOME REGGAE CHAPPIE, AND NOW YOU TALK LIKE KENNY LYNCH?
OH, THAT'S ME ROOTS – AND WHEN I TAKE MY HAT OFF I PULL ALL MY ROOTS UP.. HAVE A GO YOURSELF!
TO TELL YOU DE TROOT, IT DON' MAKE ME FEEL ANY DEEFRAHN
HAR HAR
STOP THA CRACKS, YOU YOONGUNS! 'ITHER COOM T'OTHER SIDE!
TUBBY O'BESE AN' DARYL McBARYLL! AN' WE'LL TAN THEIR BOOMS FERRUM!
SEE ABOUT THAT BIGNOSE!
AYUP, LUV- WE'LL 'AVE SOOM O' THIS CHEESE!
IT'S VERY VERY STINKY- BUT IT'S YOUR MONEY POP!
THE OTHER TEAM DO WELL IN THE FIRST LEG.. TOO WELL!
THERE'S SOMETHING FOOTY AFISH HERE!
HERE'S THAT CHEESE YOU ORDERED ALL NICE AND SLIMY!
EE - THAT'S FOR MY PALS, TUBBY AN DARYL- BEST BLUE DE NORA!
COR, TA! WE'VE NEVER HEARD OF THIS ONE- SNIFF BLUE DE NORA!
NOW, SHOW US THESE DARTS
POO!
AS I FLAMIN THOUGHT -MINIATURE COMPUTERIZED GUIDED MISSILES!
ROTTEN CHEATS!!
LURKING JUST OUTSIDE IS THAT WILEY PAIR, PENFOLD AND CROUCHER!
AUTOMATA'S COMPUTER GAMES IDEA DETECTOR VAN
I THINK WE HAVE ANOTHER NON-VIOLENT GAME HERE MEL! LET'S CHECK IT OUT!
NON-VIOLENT?!
NEXT WEEK JUSTICE'S DONE OVER